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DIVISION OF SANITARY REPORTS AND STATISTICS

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PUBLIC HEALTH REPORTS

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STUDIES ON TRICHINOSIS

IV. The Role of the Garbage-Fed Hog in the Production of Human Trichinosis

By MAURICE C. HALL, *Chief, Division of Zoology, National Institute of Health, United States Public Health Service*

Previous papers in this series of studies[1] on trichinosis have summarized evidence indicating a high incidence of trichinae, approximately 12.5 percent, in 1,778 cadavers examined for trichinae at various places in the United States, and have noted that this high incidence warrants extensive consideration of the problem of trichinosis in this country. In any consideration of human trichinosis, it is essential that all factors contributing to the production of this disease be considered. The eating of pork is admittedly the customary source of human trichinosis, but this thesis needs elaboration as regards pork and population groups.

On the one hand, pork must be considered with reference to the swine which produce it, and the procedures, such as cooking, freezing, packing-house processes, meat inspection, etc., to which it may or may not be subjected. On the other hand, population groups must be considered to ascertain the groups which are exposed to the eating of pork having a high incidence of trichina, or groups which indulge most generally in the eating of pork not adequately cooked or otherwise processed to kill trichinae which may be present. A systematic consideration of pork and population groups, in relation to trichinosis, is needed in order that some clear, definite, and adequate control program may be developed in lieu of the present program, which is quite evidently not controlling trichinosis or even visibly gaining ground against it.

This control program, at present, is limited mostly to processing, under Federal supervision, those pork products, mostly dry or summer sausage, customarily eaten without cooking by the consumer (fig. 1, *a*), and to issuing to the public warnings to cook pork well (fig. 1, *b*). Unfortunately, almost one-third of our meat supply comes from houses not under Federal inspection or an equivalent inspection; and, as sold or as served in public eating places, uninspected pork products are shuffled, indistinguishably, with inspected products, some places selling or serving inspected, and others uninspected, products,

[1] Public Health Reports for Apr. 16, 1937, p. 468, Apr 23, p. 512, and Apr. 30, p. 539.

thereby nullifying, to a great extent, the benefits from inspection and processing. It is quite evident that the warnings to cook pork well are being disregarded to a very great extent, and a consideration of groups found to have a high incidence of trichina infestation shows that ordinary newspaper warnings would be of practically no value at all so far as reaching these groups is concerned.

In general, food habits are highly individual and so very variable that one may assume, at this time, and in the light of available evidence, that human trichinosis in geographic and other population groups would usually be more definitely correlated with the incidence of trichinae in the swine from which the pork consumed by them is produced than with the food habits of the groups, except for such cases as those of the mentally deranged under prolonged hospitalization, in which the food habits are determined by the hospital management rather than by the individual. This correlation between porcine trichinosis and human trichinosis in geographic areas has been advanced by Hall and Collins (1937) as an explanation for the variations in the published findings in incidence studies in various parts of the United States.

The role of the garbage-fed hog in the production of human trichinosis is considered in the present paper. The importance of the garbage-fed hog in this connection was pointed out by Mark (1889) almost half a century ago, on the basis of studies conducted at Boston and vicinity. Mark reported that in 1881 he examined 500 hogs from Chicago, representing Middle Western swine of unknown origin, and hence a mixture of some grain-fed hogs and some hogs fed on swill and similar feed, and found trichinae in 2 percent of these. A subsequent study, from 1883 to 1888, of 3,064 hogs, almost all of which were raised near Boston and fed on offal, garbage, and slops containing table scraps, showed that 391, or 12.86 percent, had trichinae. Of 234 garbage-fed hogs from State institutions, 42, or 17.95 percent, had trichinae. These high percentages, approximately 13 to 18 percent, were obtained on microscopic examination of approximately only 1 grain of diaphragm muscle. Hall and Collins (1937) report 19 human cases found on microscopic examination in which there was less than 1 trichina per grain, i. e., less than 15 per gram, a gram being the amount of muscle examined by Hall and Collins; and these 19 cases represent over 70 percent of the 27 cases found by microscopic examination. It is evident that the high incidence found by Mark on examination of 1 grain of muscle was well below the true incidence, and that the examination of 1 gram of muscle would have raised his percentage very definitely. It seems probable that an incidence between 25 and 50 percent would be a conservative estimate.

Mark discussed the relative importance of pork scraps in garbage, as compared with the importance of rats, as a source of trichinae in

swine, and concluded that pork scraps are the important source. He noted that nowhere in the world have swine been found to have so high an incidence of trichinae as he found in the vicinity of Boston, and stated that conditions there for swine acquiring trichinae from rats did not appear to be more favorable than in European cities. He noted, also, the scarcity of observations of swine eating rats. On the other hand, the practice of feeding swine on offal from slaughtered swine, with its content of muscle in attached diaphragm and other parts, and the practice of feeding garbage with its content of uncooked pork scraps, accounted, in his opinion, for the high prevalence of trichinae in swine around Boston, especially in view of the high percentage of infested swine constituting the source of these pork scraps.

Soon after Mark's paper was published, Calvin (1890), in a study made in Iowa, reported that hogs fed on offal at slaughterhouses showed a high incidence of trichinae, about 1 in every 10 to 12 hogs being infested; that hogs kept in town by private families and fed in small pens also showed a high incidence of trichinae; and that hogs fed on corn and fattened in the open fields on farms were almost entirely free from trichinae, an examination of 300 swine from one place showing no trichinae. Calvin noted that rats abound in hog pens but not in fields, and was inclined to regard them as of major importance. However, he ignored the parallel fact that garbage is fed to hogs in hog pens and not to hogs in fields, and failed to bridge the gap in his argument by showing that swine actually eat rats to any notable extent.

In the United States, microscopic inspection of export pork for trichinae was begun in 1891. The figures for the 8 years from 1898 to 1906, during which American pork for export to certain countries, especially Germany, was thus inspected, show that in over 8,000,000 hogs the incidence of live trichinae, which trichinae are the ones of importance as capable of transmitting trichinosis to man, was 1.41 percent. This pork was prepared for export at only a relatively few large plants, and in March 1900 there were only 39 packing houses with microscopic inspection out of a total of 156 houses under Federal inspection. These houses were all in 14 cities, and these cities were located as follows: 3 in Iowa, 2 in Illinois, 2 in Ohio, and 1 each in Nebraska, Kansas, Missouri, Indiana, Wisconsin, New York, and Massachusetts. Obviously the reported incidence of trichinae is, in general, that in swine from the Middle West, largely grain-fed animals. The incidence of live trichinae for these swine is approximately that recently reported by Hall (1935) and Schwartz (1936) for grain-fed hogs at the present time. The reports of Hall and Schwartz cover studies in the Federal Bureau of Animal Industry in recent years, Hall (1935) reporting an incidence of 1.5 percent of live trichinae in grain-fed hogs, and 4.8 percent in garbage-fed hogs, and Schwartz

(1936) reporting approximately 1 percent incidence in grain-fed h[illegible] and approximately 5 percent in garbage-fed hogs, the incidence bei[illegible] based on an examination of thousands of hogs. Since garbage-fe[illegible] hogs have live trichinae apparently between three and five times [illegible] commonly as do grain-fed hogs, and since, therefore, the pork fro[illegible] these garbage-fed hogs is apparently three to five times as dangero[illegible] as that from grain-fed hogs as an agency for transmitting huma[illegible] trichinosis, the garbage-fed hog evidently presents a special proble[illegible] in the general problem of trichinosis.

Garbage-fed swine could become infected with trichinae by eati[illegible] trichinous rats, as Calvin (1890) and others, previously and since have suggested, or by eating uncooked trichinous pork scraps i[illegible] garbage, ignoring at this time the rare cases of swine eating the car casses of dead swine in fields or pens. There has been much deba[illegible] as to the relative importance of rats and pork scraps in the producti[illegible] of porcine trichinosis; but the evidence seems very definitely to fav[illegible] the idea that pork scraps in garbage, table scraps, swill, and slo[illegible] are the important source. So far as rats are concerned, they are qui[illegible] common around garbage-feeding plants, as well as around dirty h[illegible] pens, and often show a high incidence of trichinae; but, in the exper[illegible] ence of the writer and many others, the rats and swine appear to li[illegible] together, as a rule, on friendly terms. The writer has yet to see [illegible] hog eat a rat, and those persons with whom he has discussed t[illegible] matter, some of them with long experience, up to 24 years, arou[illegible] garbage-feeding plants, have either never seen hogs eat rats or h[illegible] seen them do so very rarely. Mark (1889), who investigated tric[illegible] nosis in garbage-fed hogs over a period of 5 years, has stated, likew[illegible] that swine raisers rarely or never know of swine eating rats. Presu[illegible] ably, swine on a feed containing very little protein might occasiona[illegible] kill and eat rats, manifesting what might be regarded as a form of pi[illegible] following dietary deficiencies, or rats may be killed and fed to swi[illegible] a thing which does happen and which might condition swine to th[illegible] eating of rats; but one may summarize the present evidence [illegible] indicating that although the eating of rats by swine does occur, it is [illegible] relatively rare occurrence. Rats perpetuate rodent trichinosis [illegible] some extent by cannibalism, a common thing, and to some extent [illegible] eating pork scraps in table scraps and garbage; but this form [illegible] trichinosis probably operates, for the most part, as a closed circle [illegible] rat trichinosis (fig. 1, (1)) lying outside the circle of a porcine trichino[illegible] (fig. 1, (2)) perpetuated primarily by swine eating pork scraps fro[illegible] trichinous swine, and outside the field of human trichinosis (fig. 1, (3[illegible] in which the circle of events is never completed and trichinae comi[illegible] to rest in human beings can no longer get back to a cycle in new hos[illegible] (fig. 1). The idea that rats are important in producing porci[illegible] trichinosis is not substantiated by data, observational or experiment[illegible]

showing that swine eat rats to any extent that would account for the known incidence of trichinae in swine, and this gap must be bridged before a preponderant connection between rodent trichinosis and swine trichinosis derived from rodents can be established. Billings (1880) reported that, at the Knacker's yard on Spectacle Island, Mass., he found trichinae in 39, or 76.5 percent, of 51 rats, whereas he found no trichinae in 28 swine kept at the same place and fed on grain and cooked meat.

On the other hand, the common occurrence of pork scraps, including those not so cooked or processed as to kill trichinae, in garbage and swill, and the eating of such scraps by large numbers of swine, are well-established facts. Americans throw into the garbage much more food than is thrown away by other nations, and as they rank about fifth in amount of meat per capita purchased, the discarded food includes a great deal of meat. This is especially true of so-called hotel garbage, which is definitely high in discarded meat, although the less valuable alley garbage, the household garbage, contains more meat in the United States than it does in other countries.

It is the testimony of the field veterinarians of the Federal Bureau of Animal Industry that pork scraps are usually present in garbage and swill. The veterinary field force engaged in hog-cholera control has paid special attention to this subject for many years in tracing outbreaks of hog cholera; and in the State of Maryland, where this subject has given particular investigation by Dr. I. K. Atherton and his field force, approximately 80 percent of outbreaks of hog cholera were traced to garbage containing uncooked pork scraps. The extent of garbage feeding varies locally in accordance with the amount and kind of feed available, and over the Middle West, with plenty of grain available, there is relatively less garbage feeding than along our seaboards. It varies also with the price of pigs, and currently it appears that, with prices of pigs above 6 cents a pound, garbage feeding is profitable in Maryland, and with prices below 6 cents it is not profitable. The precise critical price would vary with different swine growers and other factors.

There are, usually, approximately thirty to forty million hogs slaughtered annually in the United States, and the scraps of pork from these millions of hogs are trimmed out in butcher shops, hotels, homes, and elsewhere for various reasons—spoilage, discoloration, etc.—and these trimmings and other discards are thrown into the garbage. Between 1 and 5 of every 100 of these discards, on an average, will contain live trichinae, and the total scraps, from almost 100,000 hogs daily, which will contain live trichinae from approximately an indicated 1,000 to 5,000 infested hogs, will run into many thousands daily. The feeding to swine of such scraps, as constituents of garbage or swill, constitutes a dependable, large-scale, year-round source of trichinae

for swine. At times the feeding of pork scraps in garbage takes the form of a case reported in the New Jersey press in 1933, in which part of the sausage responsible for 28 clinical cases of human trichinosis, with at least 1 death, was thrown into garbage cans and the garbage distributed to many hog pens. Compared with pork scraps as a regular constituent of the feed of large numbers of swine, it seems probable that rats are merely an incidental and accidental bit of food.

In view of this, the garbage-feeding industry deserves our attention. This industry has a number of dubious features. In general, garbage feeding, as usually practiced, is (1) a public health problem because garbage is a highly important source of human trichinosis; (2) a danger to domesticated animals as a source of porcine trichinosis, hog cholera, foot-and-mouth disease, and other diseases; (3) an esthetically objectionable and insanitary affair, since the large majority of garbage-feeding plants are offensive to the eyes and nose of the public, are quite generally infested with rats, and are notable breeders of flies; and (4) is often economically unsound or, at least, a relatively unprofitable enterprise.

The evident role of garbage in connection with human trichinosis has been discussed in the preceding statements. Its role in the spread of diseases of domesticated animals is common knowledge among veterinarians. It is credited with a majority in some places, and a large minority in others, of outbreaks of hog cholera, and with some part of the 10 outbreaks of foot-and-mouth disease or a somewhat similar disease in the United States. The objectionableness of most garbage-feeding plants from an esthetic point of view is known to everyone who is familiar with them, and can be ascertained by anyone who wishes to visit them. As regards some of their various features, we cite the recent testimony of two of the outstanding and highly competent veterinarians in the public service, Dr. W. J. Butler, State veterinary surgeon of Montana, and Dr. Leslie M. Hurt, county live stock inspector of the Los Angeles County Live Stock Department.

Butler (1936) stated with regard to hog cholera: "Unless in garbage-fed animals, it may be considered a negligible disease in the hog population of Montana. The feeding of garbage may appear to some people to be economically sound, and it probably is under certain restrictions and under competent veterinary observation. However, in the ordinary skip and miss fashion of feeding garbage, it is not economically sound and is an abomination from a sanitary standpoint. Practically every outbreak of hog cholera in Montana during the past 15 or 20 years has been directly traced to the feeding of contaminated garbage. We have made this statement in many previous reports. We have endeavored to have the legislature pass a law governing the feeding of garbage, but the feeding of garbage still continues. The sanitary

board has certain restrictions governing garbage feeding, but does not have the authority to prohibit the practice."

Hurt (1936) stated: "There are 34 licensed garbage-feeding hog ranches in the unincorporated areas of Los Angeles County, and 9 located either in unincorporated areas or maintained by public institutions. The total hog population on these ranches is approximately 47,000 head * * *. The nutritional value of garbage has been at a low level during the last few years. Gains which may be expected from feeding local municipal garbage vary from 27 to 35 pounds live weight of pork per ton garbage." Obviously, gains of approximately 30 pounds per ton of feed can be profitable only on the basis of feed which costs little or nothing, and garbage feeding is sometimes a subsidized industry which is paid to collect and remove garbage, and any profits that may be made by feeding the garbage to hogs merely supplement this payment. In other words, the garbage must be disposed of, and feeding it to hogs is an alternative to burning it, converting it into fertilizer, or otherwise disposing of it. On the other hand, if its objectionable features can be eliminated, garbage feeding may be regarded as a conservation measure of some importance. Thus, Mr. Lloyd Aldrich, city engineer of Los Angeles, states that Los Angeles receives almost $1 a ton for its garbage, instead of paying $1.50 a ton to incinerate it, an item of approximately $450,000 benefit to Los Angeles annually.

In 1933, the Delaware State Legislature passed a law prohibiting the deposit of garbage under any circumstances on certain water sheds, and the maintenance of insanitary conditions in piggeries was made an infringement of the State law relating to nuisances. The bringing of garbage or household refuse into the State was made permissible only after a permit had been obtained and a bond prepared, the bond being forfeitable if sanitary conditions were not maintained at the piggery. There are ample reasons for keeping both pigs and garbage off those water sheds or, at least, those parts specifically involved, from which supplies of drinking water are obtained.

From both the esthetic and sanitary points of view, it appears that swine growers in general have not given adequate consideration to cleanliness as a matter influencing the consumption of pork. Although the consumer buys his pork as he sees it at the butcher shop, it seems probable that there are, in the aggregate, many persons in the United States who do not eat pork because they have seen pigs in filthy hog pens or garbage-feeding plants, and many others who would eat more pork if all the pigs they saw were the clean, sleek, uniform lots produced by a rigid adherence to the swine-sanitation system developed by the Federal Bureau of Animal Industry and known as the McLean County Swine Sanitation System (fig. 1, *c*, *c*). In this matter the

swine industry is very definitely out of step with the times. The dairy industry has moved away from its old position in which milk producers accepted the presence of cow manure in milk as an unavoidable necessity, and were satisfied that all reasonable demands had been met when the manure was strained out. Poultry production is now, to a large extent, on the basis of clean and sanitary buildings and grounds for fowls. Abattoirs are relatively clean and sanitary, as a rule, especially those under Federal inspection. At a time when foods of all sorts, animal or vegetable, are being produced under cleanly and attractive surroundings, and marketed in a large variety of protective packages and wrappings, the swine industry is not showing the business sagacity that might be expected of an industry of such magnitude when it continues to produce swine under conditions, visible to the public eye, that justify the ancient and still current use of the term "filthy swine." Under favorable conditions, swine are as clean as other animals in general, and under the swine sanitation system they are definitely presentable and in marked contrast to their unfortunate comrades of the usual garbage-feeding plant and the dirty pigsty. Those who raise swine under the sanitation system have a legitimate grievance against any practice that implies, falsely, that swine belong in the same category as the buzzard, the carrion crow, the maggot, and the dung beetle. Swine are naturally pasture animals, and not the scavengers that man sometimes makes of them.

It appears to be only a question of time when the swine industry will have to choose between voluntarily bringing its general business procedures into line with those of the better swine breeders and producers and of food industries in general, on the basis of better business management and conformity to public taste, or being subjected to restrictive legislation and the possibility of lessened profits. Public interest requires that dangers and nuisances be abated or abolished as completely and promptly as possible, with the minimum of injury to those who may be responsible when they have acted innocently and in good faith.

Specifically, what could be done about the garbage-feeding industry in the interests of the industry and of the public? Since garbage carries pork scraps which are, apparently, the basic source of trichinosis in man and the direct source of trichinosis and hog cholera in swine, as well as a source of foot-and-mouth disease outbreaks, all garbage fed to swine could be cooked to remove these dangers (fig. 1, *d*); Canada requires the cooking of all garbage not produced on the premises where it is fed. In 1936, the total of all Canadian swine fed such garbage, 46,000, was less than the number, 47,000, given by Hart (1936) as fed near Los Angeles. Swine can and do thrive on boiled or steam-cooked garbage of good grade, such as hotel or institutional garbage, provided such constituents as are objectionable to

swine (coffee grounds, citrus fruit rinds, etc.) are removed or are present in only relatively small amounts. However, since the use of boiling water or steam adds to the general messiness of garbage and lowers its already low content by weight of useable food, something might be done in the way of developing a dry-cooking process for garbage, perhaps along the line of the process used for desiccating cut feed for cattle or the dry rendering process of the packing plants. Industry in general depends on research for its advancement, and some of the State agricultural experiment stations or other agencies could probably carry out the research necessary to develop better methods of handling garbage, in the interest of the swine industry. Trichinae and hog-cholera virus are quickly destroyed at the temperature of boiling water, or even lower temperatures, and it should be easy to attain this amount of dry heat, especially in shredded material. Trichinae are killed at 55° C., and the Federal Bureau of Animal Industry requires a temperature of 58.33° C. (137° F.) in packing-house procedures for killing trichinae.

As regards the esthetic objections to garbage feeding, the use of dry-cooked garbage, and the more general use of concrete, ratproofing and rat trapping (fig. 1, *e*), and cleaning, with frequent inspections by competent authorities, would overcome these esthetically objectionable features. There are, in this country, clean garbage-feeding plants, and although they are very much in the minority, the clean, sanitary garbage-feeding plant is not an unattainable ideal. There is ample reason, from the standpoint of public health and public taste, for asking that our pork supply come from pigs which are protected from trichinosis and raised under cleanly and sanitary surroundings. It is desirable that these requirements be met by the industry, rather than that the public, collectively or as individuals, demand assurance that the pork it buys is not from garbage-fed swine, thus moving in the direction of the abolition of the garbage-feeding industry rather than of its reform and improvement.

As regards the feeding of garbage, table scraps, and swill, with their content of pork scraps, to swine on farms, what has been said about garbage-feeding plants applies, in some measure, to this practice. The three population groups which stand out most conspicuously in epidemics of trichinosis in the United States are Germans, Italians, and the rural group of farmers and inhabitants of villages and small towns in agricultural regions. In this rural group, the story of a hog-killing, followed, especially around the holiday season, by a big family party at which fresh pork and pork sausage are served, and the subsequent outbreak of an epidemic of trichinosis traceable to this pork and sausage, is an old and oft-repeated story. In such cases, the hog responsible for the outbreak is usually one which has been fed garbage and similar things. The remedies that should be applied on the farm

are substantially the same as for garbage-feeding plants, with the emphasis on the abolition of the dirty hog-lot and the use of the swine-sanitation system. In the case of the family with only one pig or a few pigs, to which table scraps are fed, pork scraps should be excluded from the garbage or else thoroughly cooked before being fed. Kitchen swill is a food of so little value that its danger as a source of trichinosis far outweighs its usefulness. The feeding of table scraps to chickens is a safe and profitable substitute for feeding them to swine.

The problem of the garbage-fed hog is one that deserves the attention of public health officers. It offers an opportunity for the engineer to effect fundamental improvements. It is especially within the province of the intelligent meat packers to establish requirements for sanitary conditions in the swine industry. The collaboration of physicians, veterinarians, engineers, and packers with the more progressive groups in the swine industry should lead to an early development of control measures that will begin to lower the incidence of human and porcine trichinosis in the United States.

The problem of trichinosis and its control in the United States, as it shapes up at the present moment, is about of this order:

The available evidence establishes definitely that there is a high incidence of trichina infestation in man in this country. The precise incidence varies in different States, with enough evidence to suggest that over the country as a whole between 1 person in 10 and 1 person in 20 of those over 20 years old may be infested with trichinae. No more precise figure is necessary to establish trichinosis as one of our major public health problems.

This block of human trichinosis rests on a basis of swine trichinosis, and the incidence of live trichinae in swine over the country as a whole is apparently between 1 and 2 percent. This incidence will vary, apparently, from 0 percent in swine raised under the swine-sanitation system, through a small fraction of 1 percent in Southern swine and 1.5 percent in so-called grain-fed swine, to between 4 and 5 percent in garbage-fed hogs. The incidence of 1.5 percent in so-called grain-fed swine of the Middle West is probably a component of a block of pasture-raised hogs, free or almost free from trichinae, and a block of garbage-fed hogs or hogs fed on table scraps, swill or offal, with an indicated 4 to 5 percent of these infested with live trichinae.

The status of trichinosis in these groups of swine in the United States does not appear to have changed materially in the past 50 years, except for a decline in incidence in what were probably hogs fed on offal, a group now reduced to relatively small proportions. Some relevant information on this subject is summarized by de Pietra Santa (1884). Grouping the summarized information, we have the following: Apparently pasture-raised swine—100 from Indiana, no

trichinae (Detmers; 1883). Southern swine: 4,146 southern swine, no trichinae; 241 swine from Louisville, Ky., 0.83 percent trichinous; of a total of 5,400 swine examined at New Orleans, 22, or 0.4 percent, trichinous (Deverson; 1881); 30 swine at Atlanta (stated as in Tennessee), no trichinae (Simpson; ante 1884); 180 swine at Nashville, Tenn., no trichinae (Steger; ante 1884); 330 swine at San Antonio, Tex., 0.6 percent trichinous (Meyers; ante 1884). Grain-fed swine—At Chicago, 2 percent trichinous (Atwood and Belfield; 1886); at Chicago, 3,331 swine, 80, or 2.4 percent, trichinous (Detmers; 1883). Apparently garbage-fed, offal-fed, or mixtures of these with grain-fed swine—In Dearborn County, Ind., in 1874, 16.3 percent trichinous, and between 1874 and 1884, 6.5 percent trichinous (Harding and Robbins; ante 1884); 8,773 swine at Boston, Mass., 347, or 4 percent, trichinous (Billings; 1879–81); 529 swine from St. Louis, Mo., 3.4 percent trichinous (Deverson, 1881).

Mark's (1889) incidence of 12.86 percent is specified as for swine fed on offal, among other things, and his incidence of 17.95 percent and Harding and Robbins' (ante 1884) incidences of 16.3 percent and 6.5 percent are probably for swine fed on offal. The decline in offal feeding and in the incidence of trichinae resulting from it is not due to our control measures for trichinosis, but to improvements in the swine industry and the packing industry and to the Federal meat inspection activities in developing sanitary conditions around packing plants. This improvement is our one visible achievement in the control of trichinosis.

Swine trichinosis, then, finds its roots in a swine industry which has as its component parts, so far as trichinosis is concerned, the following groups: Swine-sanitation or pasture-raised swine, southern swine, pig-pen or hog-lot swine fed table scraps, swill, and slops containing pork scraps, and garbage-fed swine. The radical solution of the trichinosis problem appears to be this: *Keep all uncooked or inadequately cooked pork of all sorts out of the feed of swine.* This is obviously a matter of either feeding no material containing pork to swine or cooking it thoroughly before feeding it.

So far as we have data available on which to formulate conclusions, there has been no evident decline in the incidence of either human or porcine trichinosis in the United States in the course of the past 40 years. Hence, it appears that our control measures have been of no value except as they may have prevented a rise in incidence, and, so far as real control is concerned, this possibility is of only academic interest and its consideration would be purely a matter of speculation.

Real control is something which must come from the swine industry itself. If that industry were well organized on a Nation-wide basis, the problem might well be put up to such an organization. However, the industry is not so organized, and swine are raised by many

thousands of unorganized and highly individualistic farmers, stockmen, and garbage feeders. To undertake to reach and instruct all of these persons, and to bring into line any recalcitrant and indifferent individuals by governmental and legislative measures, is not a realistic program at this time.

A more realistic program is to put the problem in the hands of the packers. The packing industry is a highly organized industry, with a far-flung corps of efficient employees over the entire country. Its approach to the swine industry is one based on mutual interests and on long and adequate acquaintance. It has the control that follows from its position as the purchaser of the swine industry's product.

It is highly probable that the packing industry would accept the task of bringing about improvements in the swine-raising industry. The advantage to both the packer and the swine raiser of removing the stigma of trichinosis from pork is fairly evident. No less evident is the advantage of better advertising in the way of universal exhibits of swine raised under sanitary conditions. Adverse court decisions, sustaining the law of implied warranty as applying to pork in trichinosis cases, even though the pork is of a sort customarily cooked before being eaten, in States having large numbers of cases of diagnosed trichinosis, is tending to make the sale of pork in such States a hazardous proceeding. Finally, the studies on trichinosis already under way or being initiated will probably result, within the next 5 or 10 years, in the finding of thousands, instead of two or three hundred cases of clinical trichinosis annually, as a result of more interest, greater clinical knowledge, and better diagnostic methods. When that happens, it will be very definitely to the interest of the packer to be able to show that he has achieved, at least, a measure of control that has not been achieved by other agencies up to the present time. His task will be simplified by the fact that the large majority of swine are slaughtered within the first year of life, and that control measures applied in any year will be effective and their results demonstrable the next year.

If the packer will cooperate in this way, scientists, public health officials, legislators, and the public generally should cooperate by giving him a fair chance to carry out his program. It will serve no useful purpose to frighten the public by newspaper publicity about a situation that has existed for many years. It would inevitably injure thousands of innocent farmers and stockmen, but it would not control trichinosis, and what we want is effective and permanent control of trichinosis, not useless and transient scares. It will serve no useful purpose to enact laws that have no sound basis in reality and practicability. Wherever the farmer or garbage feeder maintains a public nuisance, adequate laws covering such offenses should be

passed and adequately enforced; and, in all probability, the packers as a matter of self-interest, would support such action.

Meanwhile, the scientist has the task of cooperating with the physician to establish the epidemiology of trichinosis, to clarify its confusing clinical picture, to devise better diagnostic methods, and to develop a rational therapy. When these activities enable us to sort out clinical trichinosis from the many diseases with which it is confused, our studies of incidence in man and swine should show that the activities of the packers and swine industry are lowering an incidence that has not been lowered by the too casual methods employed up to date.

The problem of control is presented diagrammatically in figure 1. The relatively closed circle of rat trichinosis, maintained by cannibalism, supplemented, at B, by rats eating pork scraps in garbage,

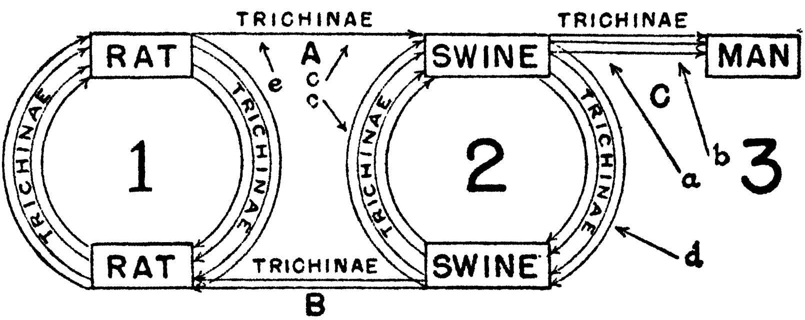

FIGURE 1.—Diagram showing the transfer of trichinae from host to host, and the points of application of control measures. 1 The relatively closed circle of rat trichinosis. 2. The circle of swine trichinosis. 3. The closed channel of human trichinosis. A. Transfer of trichinae from rat to swine B Transfer of trichinae from swine to rat C Transfer of trichinae from swine to man *a*. Application of meat inspection. *b*. Application of cooking. *c, c* Application of swine sanitation system. *d*. Application of cooking of garbage. *e*. Application of rat-control measures.

and supplying, at A, a relatively small amount of trichinae to swine that eat rats, is shown at 1. The circle of swine trichinosis, maintained mostly by swine eating pork scraps in garbage, supplemented, at A, by a relatively small amount of trichinae from rats eaten by swine, and supplying, at B, larger amounts of trichinae in pork scraps in garbage to rats, and supplying, at C, much larger amounts to man in his consumption of raw or improperly cooked pork or inadequately processed pork products, is shown at 2. Human trichinosis, as a terminal status in the life of trichinae, is shown at 3. The points of application of control measures are shown by arrows, as follows: Meat inspection (proper processing of pork products customarily eaten without cooking), at *a*; thorough cooking of pork and of pork products customarily cooked before being eaten, at *b*; the use of the swine sanitation system, to obviate the eating of pork scraps, swine carcasses, or rats by swine on farms, at *c*, *c*; the cooking of garbage, by

present methods or methods to be developed, to destroy trichinae in pork scraps in garbage, at *d*; and the use of concrete rat-proofing, and the trapping and poisoning of rats to prevent the eating of rats by garbage-fed swine, and to some extent by other swine, at *e*.

SUMMARY

Garbage-fed swine have trichinae between three and five times as frequently as do grain-fed swine, and hence are specially important as sources of human trichinosis.

Trichinosis in swine is apparently traceable to the eating of uncooked pork scraps in garbage, table scraps, swill, and similar things, much more often than it is traceable to the eating of rats by swine.

The garbage-feeding industry, as ordinarily carried on, is dangerous to the health of man and livestock, esthetically objectionable, and often economically unsound.

Suggestions are made for the elimination of the dangers and nuisances associated with the garbage-feeding industry and with the feeding of table scraps and similar things on the farm. Cooperation between scientists, practicing physicians, engineers, packers, and the swine industry is recommended as the best attack on the problem.

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A LOW TEMPERATURE BALL MILL FOR THE LIBERATION OF LABILE CELLULAR PRODUCTS [1]

By Stuart Mudd, *Professor of Bacteriology, University of Pennsylvania*, C. H. Shaw, E. J. Czarnetsky, and Earl W. Flosdorf, *Department of Bacteriology, University of Pennsylvania*

The problem of disintegration of cells and tissues for the purpose of liberating intracellular substances arises in many fields. It has become increasingly apparent, particularly in the field of bacteriology, that classical methods to this end have been only partially successful, and that many of the products obtained have been in reality artefacts, degradation products of the more complex and biologically active substances present in the intact cells.

A short time ago, an article by one of us (E. J. C.) appeared in Science, in which the extraction of labile bacterial antigen by disruption of the lyophile-dried bacterial cells at low temperature (*1*) was described. This method utilized liquid air to bring the bacteria to a temperature beyond a critical point at which the dry bacteria become brittle and are easily disrupted by mechanical agitation with a mortar and pestle.

Since that time it has been found that the critical temperature is not as low as was previously believed, and liquid air with its attending hazards could be eliminated and other refrigeration could be substituted. Dry ice in methyl cellosolve produces a temperature of about −80° C., which temperature is well below the critical temperature required, and it can therefore be substituted for liquid air. However, as contact between methyl cellosolve and the bacteria is undesirable, it is necessary to place the bacteria in a vessel, which is in turn immersed in the refrigeration mixture. As some bacteria are still resistant at this temperature, and require an hour or more of grinding for disruption of the cells, a ball mill utilizing the low temperature principle has been designed for refrigeration and agitation of the dry bacterial cells.

The accompanying sketch (fig. 1) shows the design of such a low temperature ball mill. It consists, essentially, of a monel metal grinding chamber attached to a combined one-sixth horsepower motor and speed reducer geared to 72 r. p. m. The grinding chamber contains two stainless steel balls, 1½ inches in diameter, whose curvature approximates that of the inner surface of the circumference of the grinding chamber. The motor, speed reducer, and grinding chamber rest on a hinged base in the normal position for grinding, but can be tilted to a vertical position for loading or emptying the grinding chamber, and for filling the insulated refrigeration bath. The grinding

[1] This work has been aided by grants from the U. S. Public Health Service and from the Abington Memorial Hospital.

chamber is detachable from the motor and is fitted with an airtight gland with an opening just large enough for putting in or removing the balls. This opening is tapered, and contains a tapered rubber stopper, which can be secured by the threaded gland cover. The rubber stopper has an opening just large enough to admit the slotted access tube.[3]

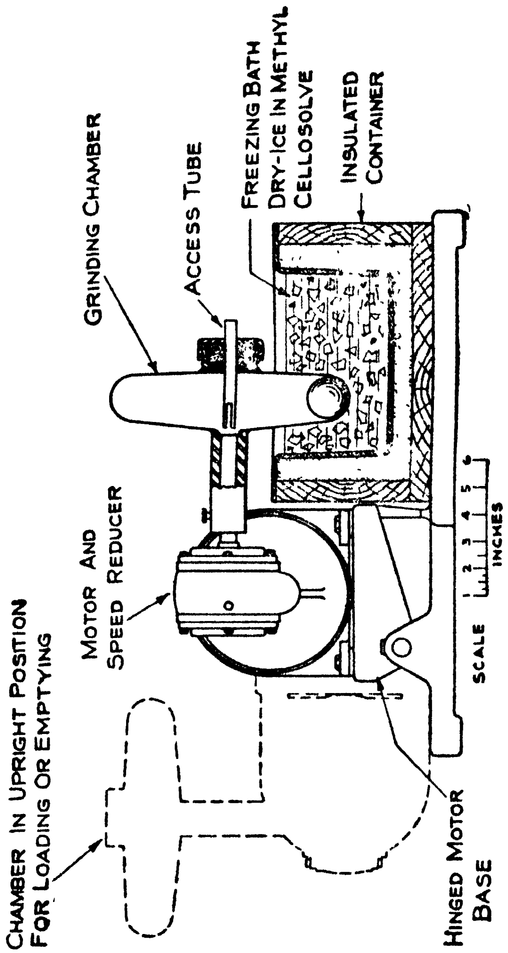

FIGURE 1.—Low temperature ball mill.

The method for disrupting bacterial cells is as follows: The organisms are grown in mass culture, centrifugalized at high speed, resuspended in a minimal volume of saline, and then placed directly into the grinding chamber together with the balls. The rubber stopper carrying the access tube is lubricated with water and is placed in the gland and the gland cover is screwed on loosely. A cotton plug

[3] The access tube is made of copper or other metal of high thermal conductivity; this construction prevents clogging with condensate during lyophile-processing.

is then placed in the access tube. The grinding chamber is attached to the motor ensemble and is then lowered into the freezing pan. The freezing pan is then filled to the top with cracked dry ice, and methyl cellosolve is slowly poured in to within a half-inch of the top of the pan. The grinding chamber is allowed to rotate in the freezing bath for 15 minutes. This procedure causes the material to freeze on the periphery of the chamber and is a preliminary step in drying the

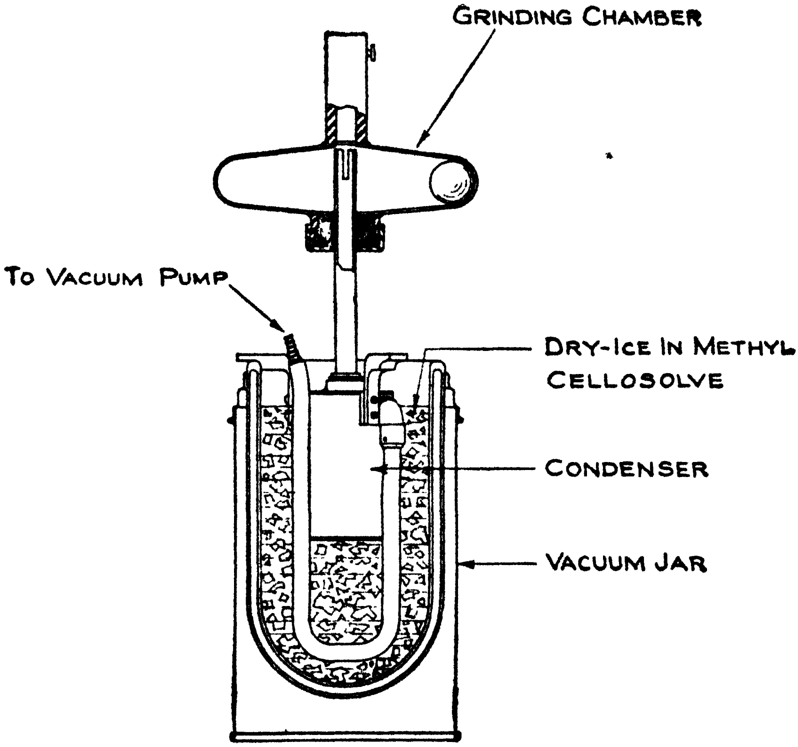

FIGURE 2.—Assembly for drying frozen organisms directly in ball mill chamber.

bacteria by the lyophile process directly in the grinding chamber, thus avoiding transfer of viable dry bacteria.

The second step consists in removing the cotton plug from the access tube and then attaching the loaded grinding chamber by means of the stopper on the other end of the access tube to a metal miniature lyophile process condenser. The condenser is immersed in a 1-gallon thermos jar, which is then packed with a dry-ice and methyl cellosolve mixture to one-half to three-fourths inch below the flat top of the condenser, as shown in figure 2. All connections of rubber to metal must be made either before the metal is cooled below room temperature, or if not, only after wiping off microscopic ice crystals from

the metal surface with alcohol; otherwise a high-vacuum-tight fit cannot be obtained. The entire system is then evacuated by a high vacuum pump, conditions being maintained as outlined in the lyophile procedure of Flosdorf and Mudd (*2*). The drying must be started at a time to permit repacking of the condenser in about 18 hours. If it is repacked much sooner than this, the condenser is likely to become plugged and not function to its full capacity. The slowly changing level of the freezing bath mixture during the 18 hours causes a resublimation of the condensate to the bottom of the condenser which permits its full volume to be available. At the end of 22 hours the bacteria are completely dried and are in a condition in which they can easily be ground by the procedure to be described below. The grinding chamber-lyophile condenser assembly has a capacity for 200 ml of fluid.

An alternative method of drying the bacteria consists in desiccating them in glass containers by the lyophile process with subsequent transfer to the grinding chamber. The amount of bacterial suspension placed in the glass container should be such as not to disturb the proper surface to volume relationship in lyophile processing (*2*). If the containers are held in an upright position during the preliminary freezing, and have straight sides and no constricted necks, the bacteria are in the form of a loose button after the lyophile processing, and can usually be transferred to the grinding chamber by allowing the button to fall out of the lyophile tubes directly into the chamber, with little danger of scattering the bacteria.

The necessity for drying the bacteria before grinding arises from the plasticity of water-ice even at low temperatures. After the bacteria are dried by either procedure and are in the ball mill, a fresh cotton plug must be placed in the exposed end of the access tube. The grinding chamber and motor ensemble are then lowered to the position with axis horizontal, which places the grinding chamber in the freezing bath. The freezing bath is prepared in the same manner as was the freezing bath for the original precooling before lyophile drying. The grinding is then allowed to proceed for an hour or longer, depending on the resistance of the material being ground.

The mill is then returned to the position in which its axis is vertical, wiped with a dry cloth, and allowed to warm to above 0° C. Water or saline is then added through the access tube, which is large enough to admit a 10-cc bacteriological pipette. The cotton plug is replaced in the access tube, and the mill is returned to the horizontal position, the refrigerating bath having been removed meanwhile. The mill is then allowed to rotate for 30 minutes to effect solution or suspension of the bacterial components, as some dried bacteria resist wetting.

The ball mill is again returned to the vertical position, and the dissolved and suspended contents are removed by means of a pipette.

Repeated washings can be made by adding more saline or water, and allowing the mill to rotate for a few minutes, the rotating always taking place on a horizontal axis.

For purposes of cleaning, the grinding chamber can be taken off the shaft and autoclaved or sterilized in any suitable manner, and then dried. After sterilization, it is advisable to boil the grinding chamber in a sodium bicarbonate solution, followed by a thorough rinsing to dissolve any protein which may adhere to the walls. As soft solder has been used in the construction of the grinding chamber, no heating above 150° C. should be used.

Experimental.—Six grams of dried hemolytic streptococci were ground for 1 hour. A nitrogen determination on the original material and on the ground, soluble material showed that 80 to 85 percent of the total nitrogen was brought into solution by this method. A stained smear of the insoluble material remaining after grinding showed many shadow cells, amorphous debris, and many broken cell fragments, together with a few normal-appearing cells, but no chains. The impression was gained that the cell wall itself was not soluble but that the contents of the cells had been spilled out by disruption of the cell wall. After being passed through a Berkefeld filter, the material appeared to be in true solution and was clear.

The extremely labile antigen of the hemolytic streptococcus is now isolated by this method as a matter of routine in this laboratory (*3*).

Mr. H. J. Henderson, of the Henry Phipps Institute, grew Johne's bacillus on Long's synthetic medium for a period of approximately 11 months. Even after this long period the medium failed to yield protein when tested by the method ordinarily employed in the preparation of "purified protein derivative" (*4*). The bacteria were filtered off, washed in sterile distilled water, lyophile-processed, and ground for 105 minutes as previously described. After filtration through a Seitz filter, protein was recovered from the filtrate in an amount equivalent to 606 mg per liter.

Tubercle bacilli were grown on Long's medium by Mr. Henderson for a period of 80 days; a sample of the medium was filtered and yielded protein equivalent to 256 mg per liter. This is about the usual yield obtained in the preparation of tuberculoprotein (*4*). The remaining medium and bacillary mass was lyophile-processed and ground in the low temperature ball mill for 90 minutes, filtered through a Seitz filter and the filtrate tested for protein. A yield equivalent to 809 mg protein per liter was obtained.

Materials other than bacteria, e. g., tissues, wool, hair, pollen, and rubber, can also be ground to a very fine powder in the low temperature ball mill.

In contrast with the sonic method of Chambers and Flosdorf (*5*) for disruption of bacterial cells, only soluble material is liberated by the low temperature method. Upon disrupting bacterial cells by the sonic method, insoluble material is also put into colloidal suspension and some of this material passes a Berkefeld N filter.

It is to be noted that the organisms are subjected to a freezing temperature during most of the process, and are in the dry state during grinding. As a low temperature and absence of water are the two conditions which are usually associated with the prevention of chemical reactions, it is believed that the low temperature ball mill can disrupt bacterial cells without chemical alteration of their labile components.

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MORTALITY IN CERTAIN STATES DURING THE FIRST QUARTER OF 1937 [1]

The following mortality rates are based upon current, preliminary reports from the State departments of health of 34 States, the District of Columbia, and Hawaii. In addition, comparative data for 18 States and the District of Columbia are shown for the three immediately preceding years.

Because of lack of uniformity in the method of classifying deaths according to cause in the various States, and because a number of death certificates were not filed in time to be included, these mortality rates are preliminary and are intended to serve as an index of current mortality conditions only within the same area for which previous reports are available. The comparison of one State with another is subject to error, owing to the varying practices in tabulation procedure and to the fact that crude rates are affected by differences in the age, sex, and racial characteristics of the population.

Mortality from all causes during the first quarter of 1937 was 6.7 percent higher than during the first quarters of 1934 and 1935 and 1.6 percent higher than during the first quarter of 1936. Important factors in this showing were minor influenza epidemics in the first quarters of both 1937 and 1936. Considering 1937 in relation to 1934 and 1935, which years were relatively free from influenza epidemics, the increases in 1937 were generally less in the Southern than in the North Central States represented in this report.

[1] From the Division of Public Health Methods, National Institute of Health.

The increased mortality from influenza was reported by 20 of the 23 States; only 3 southern States reported a decrease in mortality from last year. For the entire group of States the rate for 1937 was 89 percent greater than the rate for 1936. The relative number of deaths attributed to pneumonia increased only slightly over 1936, but even so it was about 15 percent above the number for 1934 and 1935.

Except for the influenza epidemic, mortality reports were more favorable for the first 3 months of 1937 than for the corresponding period of 1936. In fact, if the increase in influenza and pneumonia is excluded, the death rate decreased slightly from last year, although it was still well above the rates for 1934 and 1935. Among the four important communicable diseases of childhood—measles, scarlet fever, whooping cough, diphtheria—only whooping cough caused more deaths, relatively, than in 1936. Tuberculosis registered a slight increase in mortality, indicating that the check in the decline of the death rate from this disease which was first noticed in the reports for 1936 is continuing into the present year.

The birth rate continued to decline, only 5 of the 23 States with data for the preceding year reporting an increase. Although the infant mortality rate increased slightly over that for last year, it was below the average of preceding years.

Mortality from certain causes in the first 3 months of 1937, with comparative data for the corresponding period in preceding years

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Acute poliomyelitis and polioencephalitis (16)	Encephalitis, epidemic or lethargic (17)	Epidemic cerebrospinal meningitis (18)	Tuberculosis, all forms (23-32)	Cancer, all forms (45-53)	Diabetes (59)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the heart (90-95)	Pneumonia, all forms (107-109)	Diseases of the digestive system (115-129)	Diarrhea and enteritis under 2 years (119)	Nephritis (130-132)	All accidents (176-195, 201-214) •	Automobile accidents (206, 208, 210) •
19 States: [1]																								
1937	12.8	15.2	62	5.3	0.6	0.8	2.6	3.1	1.8	66.9	0.2	0.7	2.4	54.8	116.9	30.9	90.0	316.8	144.7	60.4	4.3	87.5	66.6	22.6
1936	12.6	15.6	58	5.8	.8	.9	3.4	2.0	2.1	35.4	.2	.6	3.5	54.3	114.8	30.5	97.8	313.9	142.8	61.7	4.9	91.9		
1935	12.0	15.5	64	6.0	.9	4.6	3.3	4.0	2.4	43.0	.2	.6	2.4	55.4	110.3	27.2	89.8	282.3	126.7	63.0	4.2	88.1		
1934	12.0	15.0	65	6.0	.9	5.6	3.4	4.0	2.5	27.3	.3	.6	1.0	56.0	108.5	27.4	85.3	283.7	122.9	63.7	5.9	93.4		
Alabama:																								
1937	12.2	21.4	78	5.6	1.1	(2)	(2)	5.3	2.7	114.8	.4	.3	5.3	65.0	59.3	12.8	74.2	165.6	146.9	50.0	6.6	85.4	73.3	20.3
1936	12.8	22.4	76	6.8	.8	.8	.4	2.7	4.1	113.4	.4	(2)	1.4	71.2	54.5	14.6	74.4	157.9	192.2	50.1	7.9	87.0		
Colorado:																								
1937	16.5	17.9	79	7.2	.8	(2)	3.0	8.3	3.8	153.9	1.5	.8	2.6	75.0	121.7	19.0	95.9	253.9	351.7	81.1	6.8	86.0	70.1	21.6
Connecticut:																								
1937	11.9	12.0	50	3.8	.5	1.6	1.4	2.8	.9	35.7	(2)	.5	1.2	37.5	134.8	39.4	97.0	265.9	127.2	54.9	2.8	92.9	64.4	21.3
1936	11.8	12.4	47	4.8	(2)	.5	1.1	2.1	.7	20.9	.2	.7	.9	41.3	135.7	35.5	(2)	269.3	132.4	(2)	3.5	100.2		
1935	11.4	12.8	48	5.7	.7	2.8	2.1	1.4	.9	20.3	.2	.5	1.2	44.6	120.2	35.0	(2)	250.8	115.0	(2)	1.2	93.3		
Delaware:																								
1937	16.0	16.2	80	3.8	3.1	4.6	(2)	6.2	1.5	66.6	(2)	(2)	3.1	48.0	97.5	35.6	116.1	452.0	165.6	54.2	10.8	131.6	82.0	34.0
District of Columbia:																								
1937	16.7	19.0	76	6.0	.6	2.5	1.2	5.7	5.0	51.0	(2)	.6	7.6	99.5	143.0	36.5	113.4	371.5	243.1	73.0	5.0	103.9	86.3	32.1
1936	17.1	19.2	68	6.4	3.2	(2)	1.3	2.6	6.5	21.4	.6	.6	14.3	122.8	136.4	33.8	126.1	395.7	220.3	82.5	5.8	105.3		
1935	16.2	19.2	67	3.5	.7	(2)	2.7	(2)	6.1	31.4	(2)	(2)	17.1	108.6	123.6	35.5	121.5	372.1	224.6	88.1	8.2	99.7		
Florida:																								
1937	14.1	16.8	64	7.5	3.4	.5	.2	1.9	2.4	79.5	.2	.2	8.5	62.7	90.2	24.1	119.8	274.3	100.6	94.5	13.8	104.5	116.9	48.8
1936	14.8	16.4	67	8.2	1.2	.2	.2	1.2	3.9	101.6	.7	.7	3.9	55.8	88.2	24.0	118.1	305.0	139.6	84.5	5.1	124.4		
1935	14.1	16.6	68	9.7	1.3	5.3	(2)	3.3	4.5	95.7	.8	(2)	.3	58.0	89.5	26.4	110.8	276.4	106.5	82.7	8.0	120.1		
Georgia:																								
1937	10.7	17.7	69	7.5	1.7	.3	.4	2.4	2.6	194.8	.5	.4	1.8	47.6	50.0	11.6	83.8	156.4	120.2	47.3	4.6	94.9	63.5	25.1
1936	12.3	17.9	76	7.9	2.4	.1	.7	2.1	3.4	136.3	.3	.3	3.3	52.4	47.8	13.5	80.3	174.5	190.6	49.3	8.5	104.0		
1935	11.7	18.4	79	8.9	1.9	1.3	.8	6.4	4.3	110.0	.9	(2)	1.2	55.6	49.2	13.4	76.4	164.9	150.2	64.9	4.5	106.5		
Hawaii:																								
1937	9.5	20.4	82	5.3	3.6	102.3	(2)	.9	1.8	9.1	(2)	.9	.9	79.7	62.5	19.0	47.1	124.9	109.5	75.1	19.0	65.2	53.4	16.8
1936	8.0	20.5	75	5.0	3.7	(2)	(2)	1.8	1.8	21.2	(2)	.9	4.6	70.9	63.5	10.1	40.5	142.7	75.5	67.2	19.3	65.3		
1935	8.4	22.4	73	5.5	1.0	(2)	(2)	2.9	(2)	7.6	(2)	(2)	2.9	77.1	61.9	14.3	44.7	115.2	78.1	68.5	19.0	80.0		

Idaho:																								
1937	12.0	20.4	57	3.6	.8	6.6	2.5	1.6	(2)	118.9	(2)	.8	2.5	28.1	93.3	11.6	78.5	189.1	128.8	67.7	5.8	37.2	66.1	20.6
1936	11.5	20.2	48	2.9	.8	1.6	17.4	1.6	8	27.4	(2)	(2)	12.4	28.2	82.1	10.8	76.3	209.0	161.7	58.0	.8	26.5	------	------
1935	10.3	18.8	77	8.6	1.7	2.5	2.5	12.7	(2)	37.2	(2)	4.2	5.9	26.2	70.3	16.1	60.1	149.9	144.8	63.5	1.7	28.8	------	------
Illinois:																								
1937	12.8	13.2	57	5.1	.2	.1	3.7	2.6	2.5	51.5	4	.5	2.5	52.4	127.2	31.8	80.5	355.5	123.9	71.5	2.8	110.3	74.1	29.2
1936	12.6	13.2	53	4.3	.2	.2	5.1	2.2	2.8	22.9	.1	.2	3.2	51.8	127.6	33.9	89.3	351.8	118.1	66.2	3.4	115.1	------	------
1935	11.9	13.1	57	5.5	.8	8.3	7.4	3.1	3.0	40.7	.2	.3	3.9	53.7	124.1	26.8	74.9	288.8	121.9	69.0	3.0	104.9	------	------
Indiana:																								
1937	13.1	14.4	64	3.4	.1	.3	5.6	5.0	1.6	90.2	.5	.5	2.8	54.6	103.0	18.7	126.9	287.4	181.1	(3)	4.0	69.7	73.0	32.5
1936	12.8	14.6	56	5.3	.5	.3	5.1	1.4	5.7	43.4	.1	1.2	1.6	51.3	102.9	20.2	140.6	283.4	157.3	(3)	3.6	88.0	81.8	25.5
1935	12.4	14.1	65	6.0	.7	6.6	6.3	5.9	3.5	58.2	(2)	.6	3.5	52.0	111.5	15.2	143.0	290.7	137.3	(3)	2.7	69.1	73.8	30.5
Iowa:																								
1937	11.4	13.5	59	6.7	(2)	.2	7.0	1.7	3	96.5	6	1.3	1.1	22.1	124.1	25.9	117.0	244.9	110.9	52.8	3.0	68.8	47.0	14.9
1936	10.9	17.3	47	5.2	1.3	.3	6.2	2.1	1.9	28.6	(2)	(2)	3.5	22.9	124.1	29.4	120.2	267.2	113.2	57.9	2.7	74.5	------	------
1935	10.9	14.2	62	4.8	1.1	15.8	2.7	1.4	2.6	45.4	(2)	.5	1.4	28.5	120.0	26.6	107.1	240.1	115.2	57.3	2.9	60.3	------	------
Louisiana:																								
1937	13.2	18.8	79	8.1	4.8	1.5	8	5.7	4.0	141.3	2	4	2.1	72.6	79.4	19.7	72.0	222.2	159.6	65.1	9.6	112.1	69.1	23.1
1936	13.1	17.4	88	11.1	3.6	3.4	.4	5.3	5.5	80.1	.6	.4	1.9	71.6	71.8	22.0	78.6	237.0	179.0	69.1	12.1	114.0	------	------
1935	11.6	17.6	72	7.4	5.4	9.2	1.1	3.1	5.5	52.8	.8	.4	1.3	75.0	72.1	18.0	72.1	195.7	122.8	70.4	9.0	110.4	------	------
Maine:																								
1937	14.3	16.6	69	6.5	1.4	.5	.5	1.9	.5	100.3	(2)	(2)	1.4	30.1	146.0	23.6	125.8	391.4	160.1	57.9	4.7	101.3	46.2	12.2
Maryland:																								
1937	15.4	16.6	72	4.4	.7	4.3	1.2	7.0	2.4	47.8	5	2.2	5.1	84.8	127.8	30.2	128.3	366.9	194.4	57.2	6.0	163.5	84.5	31.9
1936	15.0	16.9	65	5.2	1.2	2.9	7	3.6	2.2	23.5	(2)	1.4	13.2	84.8	133.5	33.4	132.5	355.6	184.8	54.3	3.8	168.2	------	------
1935	14.6	17.0	68	6.4	.7	2.7	2.4	4.1	2.2	42.0	(2)	.7	4.1	86.0	127.6	31.8	127.8	330.5	178.1	62.7	6.3	140.9	------	------
Michigan:																								
1937	12.4	17.4	61	4.1	.2	(2)	5.5	3.7	1.2	50.2	(2)	.2	1.2	44.2	116.6	28.8	95.1	307.1	136.2	64.8	4.1	65.8	73.4	29.4
1936	12.0	18.0	56	6.0	.4	4	3.7	2.4	.7	19.8	3	.8	1.5	44.1	113.4	28.8	99.6	302.8	130.0	71.1	6.1	71.5	------	------
1935	11.9	17.7	61	5.8	.6	3.1	3.5	3.0	.7	33.6	(2)	.2	.6	45.9	112.2	29.4	95.4	281.2	124.5	70.5	4.3	70.2	------	------
Minnesota:																								
1937	11.6	17.0	53	4.3	.3	.3	3.2	1.8	6	76.7	(2)	.9	1.4	34.4	140.9	26.7	99.6	250.3	127.7	56.5	1.5	47.9	62.6	16.7
1936	11.0	17.1	49	5.1	.8	1.5	8.8	1.1	3	16.9	.2	.4	2.4	35.1	128.0	27.8	94.2	256.6	111.2	58.9	4.7	50.0	------	------
1935	10.6	16.9	56	5.8	(2)	3.6	4.6	3.4	.5	36.9	.2	1.1	2.5	34.3	132.0	22.8	85.2	219.1	111.5	64.4	4.0	54.8	------	------
Montana:																								
1937	14.3	18.8	69	3.7	3.0	.8	6.9	1.5	3.8	184.1	(2)	1.5	3.1	45.8	103.1	21.4	115.3	221.5	208.5	61.9	0.8	73.3	80.2	15.3
1936	12.8	18.9	53	6.8	1.5	.8	15.1	4.5	3.0	32.6	(2)	(2)	3.0	44.7	100.0	18.2	93.2	221.9	192.4	75.0	4.5	65.9	------	------
1935	12.7	18.5	78	7.0	1.5	16.0	3.0	4.6	4.6	85.5	.8	.8	1.5	48.1	105.4	16.8	80.2	211.6	196.3	94.7	7.6	85.5	------	------
Nevada:																								
1937	14.5	12.2	75	3.2	(2)	(2)	4.0	(2)	(2)	28.1	(2)	(2)	(2)	72.2	100.4	4.0	100.4	273.0	212.8	44.2	8.0	40.2	136.5	36.1
New Jersey:																								
1937	11.6	12.2	51	4.4	.3	1.8	4	1.7	.8	26.2	.1	.8	2.0	50.4	118.4	34.9	82.5	360.3	119.0	54.3	3.3	79.6	63.0	25.7
1936	11.4	12.5	49	4.8	.5	.2	1.3	1.7	6	15.3	.5	.6	2.4	53.8	123.5	37.6	90.4	339.9	114.4	54.1	3.2	83.0	------	------
1935	11.0	12.6	55	4.4	.5	1.1	.7	3.2	.9	22.3	.3	.6	.6	49.1	109.7	31.8	85.3	322.0	100.5	55.0	3.7	89.8	------	------

* Data not compiled for these reports prior to 1937

1 States included are Connecticut, District of Columbia, Georgia, Idaho, Illinois, Indiana, Iowa, Louisiana, Maryland, Michigan, Minnesota, Montana, New Jersey, New York, Pennsylvania, Tennessee, Virginia, West Virginia, and Wisconsin (estimated population as of July 1, 1937, 69,663,000). List includes all of the States with available data for the 4 years covered in this summary.

2 No deaths.

3 Data not available.

Mortality from certain causes in the first 3 months of 1937, with comparative data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Acute poliomyelitis and polioencephalitis (16)	Encephalitis, epidemic or lethargic (17)	Epidemic cerebrospinal meningitis (18)	Tuberculosis, all forms (23-32)	Cancer, all forms (45-53)	Diabetes (59)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the heart (90-95)	Pneumonia, all forms (107-109)	Diseases of the digestive system (115-129)	Diarrhea and enteritis under 2 years (119)	Nephritis (130-132)	All accidents (176-195, 201-214)	Automobile accidents (206, 208, 210)
New York:																								
1937	13.9	14.2	54	4.4	0.3	0.5	1.4	1.5	0.9	29.0	(4)	0.7	2.1	64.4	153.8	44.2	77.2	413.1	160.3	71.8	6.4	86.3	68.3	20.3
1936	13.5	14.2	52	5.6	.7	1.6	2.5	1.0	.3	12.6	(4)	.8	3.5	62.1	147.0	40.4	89.8	401.8	153.7	70.3	5.7	92.1		
1935	12.8	14.3	56	5.4	.4	1.3	2.2	3.0	1.1	16.4	.1	.6	1.7	60.8	139.9	36.8	83.8	369.0	122.0	69.2	5.3	92.2		
North Carolina:																								
1937	10.4	22.2	70	5.8	1.0	.9	.6	2.6	4.9	57.9	.3	.9	1.2	61.7	52.3	11.4	84.4	168.0	130.8	44.5	5.3	88.1	69.0	26.1
1936	11.8	22.8	72	6.3	.8	.2	.7	1.2	4.8	75.0	.3	.3	1.5	58.3	53.3	13.7	(3)	(3)	186.0	(3)	6.2			
1935	11.3	23.3	73	7.0	.5	4.3	.9	12.8	4.7	78.2	1.1	.4	1.4	63.1	48.4	12.0	(3)	(3)	155.2	(3)	4.4			
North Dakota:																								
1937	9.6	19.5	69	6.2	(2)	(2)	1.7	(2)	1.7	68.9	(2)	.6	4.0	30.4	90.8	24.7	87.3	181.5	113.7	53.4	12.1	41.4	53.4	9.8
Oklahoma:																								
1937	10.6	16.1	72	7.2	1.9	1.0	2.1	1.6	3.3	121.7	1.0	.3	4.5	55.8	70.9	15.1	73.6	153.4	150.2	53.0	2.2	71.2	62.0	22.6
Oregon:																								
1937	14.6	14.8	40	4.3	.8	.4	2.4	3.2	.4	98.8	(2)	.8	.8	39.5	126.9	28.5	115.0	351.8	122.5	63.6	.4	126.9	74.7	24.1
Pennsylvania:																								
1937	13.3	15.6	61	5.6	.4	.4	2.5	3.4	1.6	76.8	.1	1.0	1.9	53.0	114.3	37.0	86.5	355.2	135.2	54.4	3.8	97.5	60.4	20.4
1936	12.6	15.9	54	5.2	.5	.6	2.3	1.4	1.8	27.0	.1	.5	1.8	46.7	113.1	34.3	101.7	344.1	124.9	57.6	6.3	94.8		
1935	12.1	16.1	63	6.0	.5	3.4	2.9	2.6	2.3	43.8	.2	1.0	1.2	49.6	105.2	31.8	91.2	306.8	127.4	55.4	4.2	95.2		
South Carolina: [5]																								
1937	8.9	14.6	107	9.9	1.6	1.0	(2)	1.0	4.9	65.5	(2)	.6	1.6	37.9	40.5	9.2	80.3	150.8	111.0	11.9	4.0	69.1	42.5	21.4
1936	10.7	15.6	105	9.4	2.0	.6	.6	2.3	3.3	82.0	.3	(2)	3.6	49.2	41.3	12.1	95.1	165.3	172.8	18.4	1.6	75.1		
1935	11.7	16.7	98	10.9	3.0	1.0	(2)	11.1	3.0	135.8	.3	.3	1.3	51.1	31.9	11.1	91.4	186.9	130.4	13.4	4.0	87.8		
South Dakota: [5]																								
1937	11.0	16.4	78	6.0	.9	(2)	6.2	.9	(2)	172.5	(2)	.9	4.5	33.1	84.0	29.5	75.1	170.8	154.7	34.9	1.8	57.2	42.9	6.2
1936	9.6	17.3	55	4.6	.9	.9	4.4	1.8	1.8	25.6	(2)	(2)	(2)	37.0	94.3	23.8	82.0	169.2	107.5	52.9	5.3	80.2		
1935	10.4	19.6	65	5.5	.9	12.5	2.7	1.8	.9	76.0	2.7	(2)	.9	32.2	91.2	15.2	89.4	139.5	151.1	51.0	4.5	77.8		
Tennessee:																								
1937	11.2	14.2	78	9.2	1.1	1.1	1.0	3.8	4.9	116.8	.3	.7	4.0	85.2	61.5	12.9	81.3	164.3	164.2	47.6	2.6	60.4	63.3	22.5
1936	12.1	14.9	75	7.9	1.1	.7	2.0	3.2	4.6	107.0	.6	.4	6.6	90.8	62.1	12.8	79.5	172.3	204.6	54.2	3.7	67.3		
1935	10.8	15.1	80	8.8	1.9	2.0	.6	3.2	5.0	86.3	.4	.6	5.9	88.8	59.9	12.4	79.3	140.3	149.2	52.6	3.2	59.4		
Utah: [5]																								
1937	11.9	20.5	55	6.4	(2)	(2)	3.6	4.8	1.2	83.8	(2)	1.2	3.6	21.5	86.2	28.7	79.0	303.9	119.7	68.2	3.6	67.0	80.2	29.9

Vermont:																								
1937	13.5	11.8	58	15.2	2.1	(²)	(²)	2.1	2.1	93.2	(²)	(²)	1.0	54.0	136.6	19.1	119.6	349.4	151.4	60.4	5.3	74.1	70.9	16.9
Virginia:																								
1937	12.7	17.6	81	5.5	9	2.8	.6	6.6	3.1	107.1	.6	.9	7.2	67.2	69.6	18.1	99.7	244.8	191.4	39.3	2.4	96.6	59.1	21.9
1936	13.4	19.2	70	6.7	1.3	1.1	.9	4.4	4.7	83.1	.5	.5	10.0	71.0	70.0	20.2	108.7	262.1	172.2	44.1	3.9	106.6	------	------
1935	12.9	18.3	82	6.6	.8	13.2	1.2	11.7	4.9	95.5	.2	.3	4.0	80.7	68.1	19.4	100.4	244.1	138.1	44.8	2.9	94.4	------	------
Washington:																								
1937	13.1	12.7	56	5.2	1.0	2.0	2.2	.2	1.2	75.3	.2	2.0	1.5	45.1	126.6	29.0	114.6	322.4	121.7	57.2	1.0	88.8	80.2	23.1
1936	13.5	13.8	48	4.6	.5	4.2	3.2	.7	.5	56.5	.7	2.4	2.9	58.0	128.2	29.1	116.5	323.9	124.8	66.5	1.0	87.6	91.7	31.8
1935	12.0	13.8	46	4.5	.2	1.2	1.7	3.7	1.5	35.8	.5	2.5	2.2	53.9	136.3	29.8	103.3	292.8	67.6	66.8	2.2	85.2	------	------
West Virginia:																								
1937	11.5	18.8	69	7.8	2.0	.4	3.1	10.1	4.6	111.1	.9	.2	5.5	54.1	69.1	16.0	80.7	195.1	156.4	48.6	5.7	70.2	89.7	18.7
1936	11.3	18.3	77	7.3	1.8	2.0	2.4	3.3	6.6	52.7	.9	.2	6.4	52.9	64.1	18.7	88.7	187.4	156.2	54.0	4.8	79.7	------	------
1935	10.8	19.5	79	7.6	3.6	10.7	5.8	13.2	8.9	65.0	.2	.4	4.5	60.3	67.4	10.9	77.0	140.5	130.4	55.2	3.3	70.3	------	------
Wisconsin:																								
1937	12.9	16.4	56	4.6	.3	.1	4.7	1.0	1.0	73.8	(²)	.3	1.1	39.6	131.5	35.0	106.7	320.5	115.6	(³)	3.9	82.3	64.4	19.1
1936	11.7	16.3	55	4.4	.4	7	7.6	2.1	.1	25.4	(²)	.3	1.9	39.3	132.6	29.2	106.8	310.6	103.2	(³)	4.4	77.0	------	------
1935	10.9	16.1	63	4.5	.1	2.5	6.0	.4	.6	25.8	.3	1.0	2.0	38.4	122.2	26.6	89.7	271.7	93.2	(³)	4.0	75.7	------	------
Wyoming:																								
1937	13.4	18.0	71	8.7	1.7	1.7	12.1	3.5	(²)	159.4	1.7	1.7	5.2	15.6	57.2	6.9	65.8	254.8	202.8	71.0	13.9	22.5	90.1	20.8

² No deaths.

³ Data not available.

⁴ Less than 1/10 of 1 per 100,000 population.

⁵ January and February

ILLNESS AND MEDICAL CARE IN PUERTO RICO

The rate of bed illness is about one and one-third times higher in Puerto Rico than it is in the United States and the death rate is twice as high. Furthermore, the average duration of illness on the island is 11 days, as compared with 7 days on the continent. Low incomes, crowded and insanitary homes, inadequate diet, and the prevalence of certain endemic diseases are factors which contribute to the high rate of illness in Puerto Rico. These are some of the findings included in a report [1] recently issued by the Public Health Service, in which the authors describe the amount and character of illness in Puerto Rico and a system of medical organization on which most of the people depend for care. The report is based on morbidity and mortality records of local health authorities, published findings of previous investigators, and data secured by a special family survey covering a representative sample of the population.

About 90 percent of the families included in the survey reported an annual income of less than $500. Naturally the amount that such families can devote to medical care is exceedingly small. Because of this widespread condition, an attempt has been made to provide, at public expense, some measure of medical service to a large part of the population. This service, locally known as "Beneficencia", is supported by each municipality with varying degrees of success, depending primarily upon the resources of the individual municipality. In the smaller third-class municipalities, service to several thousand people is limited to that which a single physician can furnish. Larger municipalities are likely to employ professional and lay assistants and to provide some type of hospital facility.

Weaknesses in the beneficencia system are revealed in the excessive patient load of municipal physicians which results in a failure to establish the right kind of contacts with patients and in the frequent replacement of physicians that leads to a lack of continuity of service. The deterioration of existing municipal hospitals is another evidence of the unsatisfactoriness of the present scheme. Practically all municipal hospitals are in need of repair, and only half of them possess equipment which might be used for major surgery. X-ray facilities, laboratory equipment, and an ambulance are found in relatively few municipal hospitals. Equipment in most clinics for ambulatory patients is not sufficient for ordinary diagnostic and treatment purposes. These deficiencies are especially applicable to third-class municipalities which have relatively small public revenues.

[1] Illness and medical care in Puerto Rico. By Joseph W. Mountin, Elliott H. Pennell, and Evelyn Flook Public Health Bulletin No. 237. Government Printing Office, Washington, 1937.

In the more wealthy first- and second-class municipalities, facilities and services are somewhat better, yet even here they fail to meet the situation.

Professional groups on the island are of the opinion that public medical care would be more effectively and evenly distributed if the insular, rather than the municipal, government assumed primary responsibility for its administration. This opinion is supported by the performance of the insular government in administering public health service and the insular institutions.

Since the survey described in the Bulletin was made, money has become available for the construction of four district hospitals which will be under insular control. It is hoped that, eventually, most of the smaller municipal hospitals can be abandoned except for use as first-aid stations and as quarters for the municipal physician, dentist, pharmacy, and public health unit.

The insular government already has the major responsibility for the institutional care of the insane, the tuberculous, and the leprous, and it operates the only hospital on the island for the care of persons with acute communicable disease. The Insular Hospital for the Insane should be enlarged by approximately 500 beds if it is to meet the demand placed upon it.

It is recognized, of course, that a complete medical service would cost several times the amount now being spent. Since there is little hope of securing such additional funds, the insular health department should concentrate on programs to bring under control such preventable diseases as malaria, hookworm disease, dysentery, and tuberculosis. Thus the sickness burden would be reduced and the demands upon existing medical facilities lessened.

The possibility of greatly improving medical service for the population as a whole appears to lie in a higher centralization of power and responsibility. To the commissioner of health, in conjunction with the insular health department, must eventually fall duties of determining standards of care and of seeing that these standards are observed in the several municipalities. Under this type of professional supervision the municipal physician may be insured greater latitude in planning his individual program and in selecting for attention those patients who are most in need of his services.

This Bulletin, which describes and appraises a system of public medical service that has been in operation for many years, should be of interest to those who are in any way concerned with public medical care.

PROVISIONAL SUMMARY OF NATALITY STATISTICS FOR 1936

A provisional tabulation, recently issued by the Bureau of the Census [1], shows a total of 2,136,059 registered births in the United States in 1936—a decrease of 19,046 from the 2,155,105 births recorded in 1935. In terms of the birth rate (number of live births per 1,000 estimated population), 1936 marks the second consecutive year of decrease and brings the rate, 16.6, approximately equal to the all-time low of 16.5 in 1933. While the 1936 rate is not the low point of the past decade, it indicates a continuation of a general birth rate decline.

Thirty-one States show a decrease in the birth rate, 3 States show no change, and 14 States and the District of Columbia show a slight increase. In no State is the change in birth rate very great.

All data for years prior to 1936 are final tabulations. Figures for 1936 are based on hand counts of copies of birth certificates received by the Bureau of the Census from State offices of vital statistics. For the States for which the shipment of copies to the Bureau of the Census is complete, these provisional figures will agree closely with the final tabulations. In other States it may be expected that a few delayed certificates will be added before final tabulations are completed. In Colorado, transcripts for only 10 months have been received. In Arizona and Illinois, transcripts for only 9 months have been received. In such cases, the 1936 provisional figure is based on the available 1936 data and on 1935 data for the months for which 1936 data are lacking. In the case of Massachusetts, the 1935 figures have been used for the State totals.

Number of live births in each State, 1932–36

State	1936	1935	1934	1933	1932
Registration States	2,136,059	2,155,105	2,167,636	2,081,232	2,074,042
Alabama	58,057	62,239	63,495	59,338	62,939
Arizona	10,036	9,139	8,492	8,125	8,523
Arkansas	32,237	35,684	37,515	35,800	37,450
California	84,417	80,131	78,346	75,036	78,093
Colorado	17,846	18,837	17,849	17,180	17,613
Connecticut	22,228	22,258	22,215	22,437	23,731
Delaware	3,922	4,036	3,988	3,922	4,294
District of Columbia	11,680	10,803	10,137	9,955	10,157
Florida	28,097	28,051	26,716	25,606	27,402
Georgia	61,667	63,260	64,661	60,984	63,717
Idaho	10,138	9,469	9,373	8,557	8,732
Illinois	109,653	111,884	110,226	107,910	111,512
Indiana	54,035	52,909	52,349	50,480	53,073
Iowa	42,650	41,137	42,463	39,575	40,459
Kansas	29,998	30,589	32,463	30,755	31,700
Kentucky	55,766	57,715	59,904	55,325	59,505
Louisiana	42,826	42,270	43,003	39,748	43,298
Maine	15,222	15,723	15,760	15,123	16,129
Maryland	26,587	27,236	27,340	27,440	28,820
Massachusetts	63,001	63,001	63,828	63,445	68,534

[1] Vital Statistics—Special Reports, vol. 3, no. 24, pp. 123–125, June 16, 1937. Bureau of the Census, Department of Commerce.

Number of live births in each State, 1932–36—Continued

State	1936	1935	1934	1933	1932
Michigan	88,426	87,446	83,925	80,923	85,736
Minnesota	47,576	45,962	45,921	44,514	46,377
Mississippi	49,447	48,320	47,863	44,274	46,273
Missouri	55,223	57,299	59,185	57,277	59,949
Montana	10,400	10,029	9,949	8,953	9,091
Nebraska	23,798	23,327	25,085	24,185	25,159
Nevada	1,420	1,423	1,434	1,353	1,260
New Hampshire	7,646	7,768	7,869	7,385	7,808
New Jersey	53,832	54,514	54,541	56,061	61,219
New Mexico	12,225	13,190	12,769	12,304	12,391
New York	182,401	184,344	185,615	187,158	198,431
North Carolina	76,181	78,753	79,704	75,422	77,902
North Dakota	13,385	13,655	14,549	13,189	14,047
Ohio	103,492	101,103	100,100	95,783	101,753
Oklahoma	41,827	43,691	47,302	43,697	41,039
Oregon	13,944	13,179	13,077	12,223	12,847
Pennsylvania	159,410	161,166	160,238	157,046	168,534
Rhode Island	10,190	10,215	10,349	10,352	11,171
South Carolina	39,197	40,598	44,265	40,319	41,518
South Dakota	12,570	12,850	13,173	12,859	13,241
Tennessee	50,570	53,314	52,393	50,148	52,491
Texas	111,036	114,721	116,603	107,950	(1)
Utah	12,532	12,695	12,636	11,910	11,974
Vermont	6,448	6,591	6,593	6,131	6,030
Virginia	51,252	51,487	52,375	51,254	54,582
Washington	23,376	22,396	22,540	20,882	21,379
West Virginia	40,853	41,774	41,476	36,263	38,803
Wisconsin	52,611	52,562	51,419	50,409	53,107
Wyoming	4,728	4,362	4,565	4,207	4,249

[1] Not in registration area.

Birth rates (live births per 1,000 estimated population) for each State, 1927–36

State	1936*	1935	1934	1933	1932	1931	1930	1929	1928	1927
Registration States	16.6	16.9	17.1	16.5	17.4	18.0	18.9	18.9	19.8	20.6
Alabama	20.3	22.0	22.6	21.4	23.0	23.3	24.0	24.0	24.5	26.3
Arizona	24.7	22.5	20.9	19.7	20.8	22.0	24.0	22.4	21.4	20.9
Arkansas	15.9	17.9	19.0	18.4	19.5	21.7	22.1	20.2	20.8	22.1
California	13.9	13.4	13.2	12.8	13.4	14.1	14.8	14.8	15.8	16.6
Colorado	16.7	17.7	16.9	16.3	16.8	17.7	18.1	17.4	18.8	(1)
Connecticut	12.8	13.0	13.1	13.4	14.3	15.6	17.2	17.1	18.0	18.7
Delaware	15.1	15.8	15.8	15.7	17.4	17.4	18.7	18.1	18.3	18.2
District of Columbia	18.9	18.2	18.1	18.3	19.3	18.4	19.1	18.4	18.7	19.1
Florida	17.1	17.4	16.8	16.5	17.9	18.0	18.3	18.8	21.5	25.6
Georgia	20.2	20.8	21.5	20.4	21.5	21.0	20.8	20.1	20.3	(1)
Idaho	20.9	19.8	19.8	18.4	19.0	20.0	20.5	19.8	20.5	20.8
Illinois	14.0	14.3	14.1	13.9	14.4	15.4	16.8	17.0	17.4	18.3
Indiana	15.6	15.4	15.4	15.0	15.9	17.0	18.2	18.3	18.9	19.7
Iowa	16.8	16.2	16.8	15.7	16.2	16.8	17.3	17.1	17.6	18.2
Kansas	15.9	16.3	17.4	16.4	16.9	17.5	17.9	17.4	18.2	18.8
Kentucky	10.3	20.3	21.3	20.0	21.9	21.3	22.6	21.7	23.0	24.3
Louisiana	20.2	19.9	20.3	18.8	20.5	20.5	20.4	20.3	20.5	22.9
Maine	17.8	18.6	18.8	18.2	19.7	20.1	20.2	20.0	20.8	20.7
Maryland	15.9	16.3	16.4	16.6	17.5	17.5	18.5	18.5	19.9	20.5
Massachusetts	14.2	14.4	14.8	14.7	16.0	16.2	17.3	17.5	18.9	19.9
Michigan	18.5	18.5	17.9	17.2	18.0	19.0	20.6	20.8	21.1	22.1
Minnesota	18.1	17.5	17.5	17.1	17.9	18.1	18.5	18.3	19.5	20.2
Mississippi	24.6	24.1	23.8	22.0	23.0	22.5	24.0	22.9	24.4	25.3
Missouri	13.9	14.6	15.3	15.0	15.9	16.4	17.0	16.9	17.6	18.6
Montana	19.6	18.9	18.7	16.8	17.0	18.0	18.6	18.7	18.5	18.1
Nebraska	17.4	17.1	18.4	17.7	18.3	19.4	19.6	19.4	20.5	20.5
Nevada	14.2	14.4	14.6	14.1	13.8	13.2	14.6	14.2	(1)	(1)
New Hampshire	15.1	15.5	15.9	15.1	16.2	16.3	17.8	17.6	18.8	19.2

See footnotes at end of table.

Birth rates (live births per 1,000 estimated population) for each State, 1927–36—Continued

State	1936*	1935	1934	1933	1932	1931	1930	1929	1928	1937
New Jersey	12.4	12.7	12.8	13.3	14.7	15.6	16.8	17.2	18.0	19.1
New Mexico	29.0	31.3	30.3	29.2	29.4	29.1	28.6	27.1	(1)	(1)
New York	14.1	14.3	14.4	14 6	15.6	16.2	17.1	17.5	18.3	19.0
North Carolina	22.0	23.0	23.6	22.6	23.7	23.1	24.1	24.7	26.4	27.7
North Dakota	19.0	19.5	20.9	19 0	20.4	20.9	21.7	21.6	22.2	21.9
Ohio	15.4	15.1	14.9	14.3	15.2	16.2	17.8	17.7	18.5	19.3
Oklahoma	16.5	17.4	19.0	17.7	16.8	17.8	17.7	16.8	18.4	(1)
Oregon	13.7	13.1	13.1	12.3	13.1	13.6	14.1	14.1	15.2	16.1
Pennsylvania	15.7	16.0	16.0	15.8	17.1	18 3	19.6	19.8	21.2	22.4
Rhode Island	15.0	15.0	15.2	15 2	16.3	16.5	17.7	18.0	19.3	20.6
South Carolina	21.1	22.1	24.3	22.4	23 2	22.4	23.2	22.7	25.0	(2)
South Dakota	18.2	18.6	19.0	18.6	19.1	(1)	(1)	(1)	(1)	(1)
Tennessee	17.7	18 9	18 8	18.3	19 4	19.5	20 0	19 5	19 6	21.5
Texas	18.2	18 9	19.3	18.0	(1)	(1)	(1)	(1)	(1)	(1)
Utah	24.3	24.7	21.6	23.2	23.4	23.6	25.4	24.6	26.0	26.2
Vermont	17.0	17.5	17.6	16.5	16.4	18 3	19.2	18.7	19.6	19.6
Virginia	19.2	19.5	20.1	20.0	21.7	21.3	22.5	22.4	23.5	24.3
Washington	14.2	13 7	13 9	13.0	13.4	13 9	14.7	14 6	15.2	15 5
West Virginia	22.3	23.0	23 0	20.3	21.9	22 4	24 0	23.8	25.8	27.1
Wisconsin	18.1	18.1	17.7	17.3	18.2	18.6	19.3	19.0	19.9	20 2
Wyoming	20.3	18.8	19.8	18.3	18.6	19.8	19.8	19.8	20.4	20.6

* 1936 figures are provisional.
[1] Not in registration area.
[2] Dropped from the registration area in 1925; readmitted in 1928.

DEATHS DURING WEEK ENDED JUNE 12, 1937

(From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended June 12, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	7,778	8,094
Average for 3 prior years	8,215	
Total deaths, first 23 weeks of year	218,894	215,242
Deaths under 1 year of age	479	574
Average for 3 prior years	564	
Deaths under 1 year of age, first 23 weeks of year	13,492	13,372
Data from industrial insurance companies.		
Policies in force	69,834,315	68,643,260
Number of death claims	12,892	12,498
Death claims per 1,000 policies in force, annual rate	9 6	9 5
Death claims per 1,000 policies, first 23 weeks of year, annual rate	10.9	10 8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 19, 1937, and June 20, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936
New England States:								
Maine	2	2			16	534	0	0
New Hampshire					76	6	0	0
Vermont					2	301	0	0
Massachusetts		2			460	834	3	0
Rhode Island		2			35	13	1	3
Connecticut	13	3			72	107	0	0
Middle Atlantic States:								
New York	42	89	[1] 9	[1] 4	1,384	1,985	4	9
New Jersey	7	8	3	9	787	647	1	1
Pennsylvania	18	40			1,408	587	7	7
East North Central States:								
Ohio	13	17	7	11	898	217	1	4
Indiana [3]	3	6	3	5	262	12	2	0
Illinois	26	42	19	23	427	36	3	10
Michigan	17	21	1		189	86	1	3
Wisconsin	2	2	11	18	59	186	2	2
West North Central States.								
Minnesota	1	4	1	1	3	103	0	1
Iowa [3]	2	3			5	6	1	0
Missouri	7	13	33	82	69	9	0	1
North Dakota	2		1			2	0	0
South Dakota	1	8			3		0	0
Nebraska		2			17	19	0	0
Kansas	6	5	1	11	24	5	0	0
South Atlantic States:								
Delaware					5	17	0	0
Maryland [3,4]	1	12	1		123	265	0	4
District of Columbia [3]	3	14			93	107	3	1
Virginia [3]	6	10			181	112	4	0
West Virginia	9	4	13	18	75	40	1	5
North Carolina [3]	11	8	17	1	196	28	3	9
South Carolina	2	1	56	52	49	19	0	1
Georgia [3]	2	8					0	0
Florida [3]	8			10		7	0	2
East South Central States:								
Kentucky	6	2	5	8	205	29	5	8
Tennessee	4	3	18	20	127	11	0	4
Alabama [3]	5	9	7	5	27	1	4	2
Mississippi	8	3					0	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 19, 1937, and June 20, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936
West South Central States:								
Arkansas	3	1	4	4	3		0	0
Louisiana	16	16	21	8	10	8	4	1
Oklahoma [5]	3	5	4	14	48	1	1	3
Texas [3]	35		138	84	239	158	5	2
Mountain States:								
Montana [3]				2	5	3	0	1
Idaho [3]			6		51	18	0	0
Wyoming [3, 6]					1		0	0
Colorado	3	1			47	21	0	0
New Mexico	5	3		1	46	16	0	0
Arizona	3	4	20	18	16	52	0	0
Utah [3, 4]					77	41	0	1
Pacific States:								
Washington	2	1			54	178	1	0
Oregon	2		7	8	3	34	0	2
California	36	22	110	517	162	1,107	2	4
Total	330	336	516	884	8,039	7,958	59	101
First 24 weeks of year	10,995	12,089	272,055	137,150	210,220	243,679	3,575	5,224

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936
New England States:								
Maine	0	0	5	15	0	0	0	1
New Hampshire	0	0	4	7	0	0	0	0
Vermont	0	0	4	14	0	0	1	4
Massachusetts	3	0	137	133	0	0	0	3
Rhode Island	0	1	19	24	0	0	0	0
Connecticut	0	0	85	21	0	0	1	0
Middle Atlantic States:								
New York	2	1	447	449	0	0	7	11
New Jersey	1	0	95	184	0	0	0	3
Pennsylvania	1	0	204	416	0	0	12	26
East North Central States:								
Ohio	1	0	76	92	5	0	8	6
Indiana [3]	0	0	46	49	9	1	3	1
Illinois	0	4	319	301	12	12	14	9
Michigan	3	1	576	283	2	0	5	2
Wisconsin	1	0	185	206	7	4	1	4
West North Central States:								
Minnesota	0	0	89	120	9	17	0	0
Iowa [3]	0	0	69	76	25	17	7	4
Missouri	1	0	93	80	10	0	7	14
North Dakota	0	0	11	29	13	4	0	2
South Dakota	0	0	26	14	3	17	0	0
Nebraska	0	0	16	31	1	9	0	0
Kansas	1	1	63	90	5	4	1	4
South Atlantic States:								
Delaware	0	0	2		0	0	0	0
Maryland [3, 4]	0	0	19	36	0	0	6	4
District of Columbia [3]	0	0	7	5	0	0	0	0
Virginia [3]	3	0	5	19	0	0	8	6
West Virginia	0	1	28	13	0	0	4	4
North Carolina [3]	3	0	18	17	0	1	3	9
South Carolina	0	0	1	1	0	5	12	12
Georgia [3]	0	0	4	8	0	0	23	21
Florida [3]	0	0	4	3	0	0	4	2

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 19, 1937, and June 20, 1936

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936	Week ended June 19, 1937	Week ended June 20, 1936
East South Central States:								
Kentucky	0	0	31	14	0	1	9	4
Tennessee	9	0	4	10	0	0	13	17
Alabama [2]	4	9	4	3	0	0	10	17
Mississippi	17	0	6	6	0	1	7	8
West South Central States:								
Arkansas	3	0	9	-------	0	0	11	2
Louisiana	1	1	8	5	0	1	18	16
Oklahoma [5]	1	0	13	10	1	3	13	10
Texas [2]	6	1	57	27	7	2	30	10
Mountain States:								
Montana [3]	0	0	-------	32	36	21	2	1
Idaho [3]	0	0	11	6	3	0	1	1
Wyoming [3] [6]	0	0	6	17	2	7	0	0
Colorado	0	0	12	18	0	0	1	0
New Mexico	0	0	17	19	0	0	1	4
Arizona	0	0	7	9	0	0	2	2
Utah [3] [4]	0	1	12	20	0	9	0	0
Pacific States:								
Washington	0	0	25	39	3	0	2	3
Oregon	2	1	16	47	13	1	0	4
California	6	6	138	219	14	7	7	19
Total	69	28	3,033	3,327	180	144	254	271
First 24 weeks of year	575	430	152,197	166,178	7,078	5,235	3,069	3,120

[1] New York City only.
[2] Typhus fever, week ended June 19, 1937, 47 cases, as follows Indiana, 1; North Carolina, 3, Georgia, 18; Florida, 2, Alabama, 6, Texas, 17
[3] Rocky Mountain spotted fever, week ended June 19, 1937, 18 cases, as follows Iowa, 1, Maryland, 3; District of Columbia, including 2 cases for preceding week, 3, Virginia, 1; Montana, 4, Idaho, 3, Wyoming, 2; Utah, 1
[4] Week ended earlier than Saturday.
[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa.
[6] Colorado tick fever, week ended June 19, 1937, Wyoming, 2 cases.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May 1937										
Alabama	53	39	372	262	107	31	3	27	5	14
California	18	159	231	14	1,267	13	15	826	115	24
Indiana	11	29	55	-------	2,677	-------	2	458	73	4
Maryland	13	33	26	2	1,832	1	0	166	0	9
Michigan	9	62	3	3	770	-------	5	3,191	17	13
Minnesota	10	10	4	-------	58	-------	0	605	105	1
Mississippi	5	9	1,507	4,462	1,407	557	19	20	3	19
Missouri	13	78	253	33	302	1	5	1,872	217	32
Nevada	-------	-------	11	-------	43	-------	0	30	1	1
New Jersey	3	47	25	2	7,262	-------	-------	768	0	5
New York	20	125	-------	3	6,519	-------	1	3,458	0	25
Ohio	21	74	100	1	7,203	-------	1	1,451	2	26
Pennsylvania	28	97	-------	-------	6,479	2	3	2,715	0	21
South Dakota	1	3	3	-------	13	-------	0	201	12	0
Vermont	-------	6	-------	-------	15	-------	1	57	0	0

Summary of monthly reports from States—Continued

May 1937

	Cases
Actinomycosis:	
Michigan	1
Anthrax:	
New Jersey	1
New York	1
Pennsylvania	1
Botulism:	
California	1
Chicken pox:	
Alabama	156
California	4, 310
Indiana	304
Maryland	640
Michigan	1, 598
Minnesota	704
Mississippi	703
Missouri	348
Nevada	26
New Jersey	1, 721
New York	3, 632
Ohio	503
Pennsylvania	3, 187
South Dakota	42
Vermont	129
Dengue:	
Mississippi	8
Diarrhea:	
Maryland	9
Ohio (under 2 years; (enteritis included)	9
Dysentery:	
Alabama (amoebic)	1
California (amoebic)	13
California (bacillary)	25
Maryland (bacillary)	4
Michigan (amoebic)	2
Michigan (bacillary)	1
Minnesota (amoebic)	1
Minnesota (bacillary)	1
Mississippi (amoebic)	109
Mississippi (bacillary)	2, 140
Missouri	4
New Jersey (amoebic)	2
New York (amoebic)	3
New York (bacillary)	22
Ohio (bacillary)	1
Encephalitis:	
Alabama	5
California	1
Maryland	1
Missouri	1
New York	13
Ohio	7
Pennsylvania	2
Food poisoning:	
California	97
German measles:	
Alabama	14
California	170
Maryland	44
Michigan	1, 321
New Jersey	270
New York	337
Ohio	90
Pennsylvania	334
Vermont	8
Granuloma, coccidioidal:	
California	2
Hookworm disease:	
Mississippi	413
Impetigo contagiosa:	
Maryland	2
Jaundice, epidemic:	
California	2
Lead poisoning:	
Ohio	18
Leprosy:	
California	1
Mumps:	
Alabama	184
California	2, 967
Indiana	199
Maryland	621
Michigan	2, 003
Mississippi	817
Missouri	114
Nevada	3
New Jersey	1, 100
Ohio	384
Pennsylvania	2, 604
South Dakota	7
Vermont	196
Ophthalmia neonatorum:	
Alabama	3
California	2
Maryland	3
Mississippi	6
Missouri	1
New Jersey	15
New York [1]	3
Ohio	70
Pennsylvania	5
Paratyphoid fever:	
California	5
Maryland	1
Michigan	3
New Jersey	2
New York	7
Ohio	1
Puerperal septicemia:	
Mississippi	37
Ohio	2
Rabies in animals:	
Alabama	118
California	227
Indiana	73
Michigan	3
Mississippi	24
Missouri	5
New Jersey	14
New York [1]	8
Rabies in man:	
Mississippi	1
Rocky Mountain spotted fever:	
California	1
Maryland	2
Nevada	5
South Dakota	2
Scabies:	
Maryland	1
Septic sore throat:	
California	12
Indiana	1
Maryland	16
Michigan	30
Minnesota	6
Missouri	95
New York	93
Ohio	120
South Dakota	1
Tetanus:	
Alabama	3
California	5
Indiana	1
Maryland	1
Missouri	2
New York	6
Ohio	3
Trachoma:	
California	9
Michigan	1
Minnesota	4
Mississippi	5
Missouri	42
New Jersey	3
Pennsylvania	1
South Dakota	2
Trichinosis:	
California	2
New York	7
Tularaemia:	
Alabama	3
California	1
Maryland	1
Minnesota	2
Missouri	1
Typhus fever:	
Alabama	25
California	3
Undulant fever:	
Alabama	8
California	11
Indiana	1
Maryland	5
Michigan	11
Minnesota	6
Mississippi	1
Missouri	4
New Jersey	8
New York	10
Ohio	1
Pennsylvania	5
Vermont	2
Vincent's infection:	
Maryland	14
Michigan	13
New York [1]	74
Whooping cough:	
Alabama	197
California	2, 497
Indiana	352
Maryland	414
Michigan	865
Minnesota	594
Mississippi	938
Missouri	621
Nevada	50
New Jersey	499
New York	1, 412
Ohio	1, 448
Pennsylvania	1, 372
South Dakota	20
Vermont	104

[1] Exclusive of New York City.

WEEKLY REPORTS FROM CITIES

City reports for week ended June 12, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	187	80	28	4,921	476	1,645	13	405	40	1,315	------
Current week	135	44	26	3,678	414	1,608	14	391	38	1,336	------
Maine:											
Portland	0	------	0	8	1	2	0	1	0	1	27
New Hampshire:											
Concord	0	------	0	0	0	1	0	0	0	0	6
Manchester	0	------	2	0	1	0	0	0	0	0	15
Nashua	1	------	------	0	------	0	0	------	0	0	5
Vermont:											
Barre	0	------	0	0	0	0	0	1	0	0	4
Burlington	0	------	0	0	0	0	0	0	0	0	6
Rutland	0	------	0	0	1	0	0	0	0	1	8
Massachusetts:											
Boston	1	------	0	46	14	35	0	7	0	46	190
Fall River	0	------	0	72	0	1	0	2	0	1	27
Springfield	0	------	0	1	0	4	0	1	0	21	29
Worcester	0	------	0	6	6	7	0	0	0	15	43
Rhode Island:											
Pawtucket	0	------	0	0	0	1	0	0	0	0	11
Providence	0	------	0	57	4	32	0	1	0	36	65
Connecticut:											
Bridgeport	0	------	0	2	2	40	0	0	0	3	26
Hartford	0	------	0	43	1	4	0	1	1	1	32
New Haven	0	1	0	3	1	3	0	0	0	0	37
New York:											
Buffalo	0	1	1	74	20	22	0	8	0	16	133
New York	39	5	2	823	80	151	0	93	6	82	1,446
Rochester	0	------	0	8	2	6	0	1	0	18	51
Syracuse	0	------	1	34	2	20	0	0	0	30	43
New Jersey:											
Camden	2	------	1	17	1	1	0	1	1	3	20
Newark	0	------	0	28	4	6	0	7	0	15	86
Trenton	0	------	0	32	5	1	0	1	0	3	32
Pennsylvania:											
Philadelphia	6	4	3	39	16	109	0	20	1	69	444
Pittsburgh	3	2	1	354	14	30	0	8	1	40	150
Reading	0	------	0	76	0	9	0	2	0	3	25
Scranton	0	------	------	1	------	7	0	------	0	0	------
Ohio:											
Cincinnati	1	------	0	75	8	14	0	5	0	17	116
Cleveland	2	1	0	592	15	88	0	10	0	39	174
Columbus	0	------	0	24	3	6	0	9	1	30	80
Toledo	1	1	1	306	2	4	0	3	0	29	72
Indiana:											
Anderson	0	------	0	29	0	1	0	1	0	0	8
Fort Wayne	0	------	1	0	2	2	0	3	0	1	33
Indianapolis	2	------	2	223	12	8	0	6	0	17	91
Muncie	0	------	0	15	2	2	0	0	0	3	11
South Bend	0	------	1	0	1	6	0	0	0	0	17
Terre Haute	0	------	0	0	0	0	1	0	0	0	14
Illinois:											
Alton	0	------	0	0	0	1	0	1	0	0	6
Chicago	20	8	1	316	30	251	0	30	1	40	629
Elgin	0	------	0	0	1	2	0	0	0	1	11
Moline	0	------	0	0	1	1	5	0	0	10	5
Springfield	0	------	1	7	0	2	0	0	1	9	15
Michigan:											
Detroit	9	1	0	94	13	363	5	21	3	60	230
Flint	1	------	0	0	4	15	0	0	0	0	28
Grand Rapids	0	------	0	52	2	6	0	0	0	20	27
Wisconsin:											
Kenosha	0	------	0	0	0	4	0	0	0	0	5
Madison	0	------	0	1	0	3	0	0	0	0	14
Milwaukee	0	------	0	10	5	60	0	3	0	23	95
Racine	0	------	0	1	0	11	0	0	0	1	12
Superior	1	------	0	0	1	1	0	0	0	8	10

City reports for week ended June 12, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Minnesota:											
Duluth	0	------	0	0	0	30	0	1	0	1	22
Minneapolis	1	------	1	1	5	19	0	5	0	21	89
St. Paul	0	------	0	2	5	3	0	1	0	61	48
Iowa:											
Cedar Rapids	0	------	------	0	------	1	0	------	0	2	------
Davenport	0	------	------	0	------	2	1	------	0	0	------
Des Moines	0	------	------	0	------	12	0	------	0	0	33
Sioux City	0	------	------	0	------	7	0	------	0	2	------
Waterloo	1	------	------	0	------	3	0	------	0	2	------
Missouri:											
Kansas City	1	------	0	1	4	16	0	5	0	10	89
St. Joseph	0	------	0	0	0	4	0	5	0	1	26
St. Louis	4	------	1	33	7	47	1	3	1	42	219
North Dakota:											
Fargo	0	------	0	1	0	1	1	0	0	3	7
Grand Forks	0	------	------	0	------	1	1	------	0	4	------
Minot	0	------	0	0	0	0	1	0	0	0	6
South Dakota:											
Aberdeen	1	------	------	0	------	1	0	------	0	0	------
Nebraska:											
Omaha	0	------	0	0	1	4	0	2	1	10	59
Kansas:											
Lawrence	0	------	0	0	0	0	0	0	0	4	3
Topeka	0	------	0	0	0	6	0	0	0	13	21
Wichita	0	------	0	5	2	0	0	1	0	9	23
Delaware:											
Wilmington	0	------	0	0	4	4	0	0	0	0	22
Maryland:											
Baltimore	3	------	0	114	16	9	0	10	4	86	218
Cumberland	0	------	0	0	0	0	0	0	0	4	4
Frederick	0	------	0	0	2	0	0	0	0	0	3
Dist. of Col.:											
Washington	7	------	0	93	6	6	0	11	0	20	152
Virginia:											
Lynchburg	0	------	0	3	1	1	0	0	0	21	13
Norfolk	0	------	0	8	3	0	0	1	0	2	33
Richmond	0	------	1	0	0	1	0	0	4	0	34
Roanoke	0	------	0	21	0	0	0	0	0	2	18
West Virginia:											
Charleston	0	------	0	1	2	1	0	1	0	0	30
Huntington	0	------	------	0	------	1	0	------	0	0	------
Wheeling	0	------	0	1	2	0	0	0	0	13	20
North Carolina:											
Gastonia	0	------	------	0	------	0	0	------	0	0	------
Raleigh	0	------	0	1	0	0	0	2	0	7	13
Wilmington	0	------	0	1	1	0	0	0	1	10	18
Winston-Salem	1	------	0	0	0	1	0	0	0	13	8
South Carolina:											
Charleston	0	2	0	0	2	0	0	0	0	3	26
Florence	0	------	0	0	0	0	0	0	0	0	6
Greenville	0	------	0	0	2	0	0	1	0	2	24
Georgia:											
Atlanta	1	------	0	1	9	1	0	4	2	18	76
Brunswick	0	------	0	0	0	0	0	0	0	2	3
Savannah	0	2	0	1	1	0	0	3	1	4	31
Florida:											
Miami	0	------	0	0	2	0	0	3	0	4	40
Tampa	0	1	1	12	1	0	0	1	0	10	26
Kentucky:											
Covington	0	0	0	36	1	0	0	0	0	5	------
Lexington	0	------	0	5	2	0	0	2	0	10	21
Louisville	0	------	0	60	3	14	0	3	0	52	55
Tennessee:											
Knoxville	1	------	0	0	1	0	0	1	0	0	28
Memphis	1	------	0	57	3	0	0	9	0	23	72
Nashville	0	------	0	8	4	1	0	2	0	2	39
Alabama:											
Birmingham	1	4	2	13	3	0	0	7	1	5	57
Mobile	0	------	1	0	0	0	0	0	0	0	16
Montgomery	0	------	------	0	------	1	0	------	1	1	------
Arkansas:											
Fort Smith	0	------	------	0	------	0	0	------	1	0	------
Little Rock	0	------	0	0	1	2	0	0	0	0	------
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	0	0	2	4
New Orleans	6	4	2	0	9	7	0	14	1	4	150
Shreveport	0	------	0	0	4	0	0	1	1	0	39

City reports for week ended June 12, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Oklahoma:											
Muskogee	0			2		0	0		0	0	
Oklahoma City	0	2	0	0	5	4	0	2	0	0	45
Tulsa	0			11		1	0		0	5	
Texas:											
Dallas	7		0	23	3	2	0	3	2	18	55
Fort Worth	0		0	2	1	3	0	2	0	6	24
Galveston	0		0	0	1	0	0	1	0	0	19
Houston	5		0	0	5	2	0	4	0	2	75
San Antonio	1		0	0	4	0	0	5	0	0	57
Montana:											
Billings	0		0	0	1	0	0	0	0	0	5
Great Falls	0		0	0	1	2	3	0	0	3	7
Helena	0		0	1	0	1	0	0	0	0	3
Missoula	0		0	0	0	0	3	0	0	0	4
Idaho:											
Boise	0		0	0	0	0	0	0	0	1	8
Colorado:											
Colorado Springs	0		0	0	2	4	0	1	0	0	10
Denver	2		0	20	2	8	0	4	1	29	78
Pueblo	0		0	1	1	0	0	0	0	0	8
New Mexico:											
Albuquerque	1		0	8	0	1	0	3	0	1	10
Utah:											
Salt Lake City	0		1	34	0	6	0	3	0	4	32
Washington:											
Seattle	1		0	12	6	1	0	5	0	50	80
Spokane	0		0	35	1	3	0	2	0	10	25
Tacoma	0		0	0	1	3	0	0	0	1	19
Oregon:											
Portland	0		0	1	4	9	0	2	0	6	84
Salem	0			0		1	0		0	1	
California:											
Los Angeles	2	7	1	18	13	34	0	18	1	82	335
Sacramento	1		0	29	4	12	0	2	1	2	30
San Francisco	3	1	0	23	7	19	0	5	0	48	160

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	1	0	1
Rhode Island:			
Pawtucket	1	0	0
New York:			
Buffalo	3	0	0
New York	3	3	0
Rochester	0	1	0
New Jersey:			
Newark	2	0	0
Pennsylvania:			
Philadelphia	3	0	0
Pittsburgh	1	0	0
Ohio:			
Cleveland	2	0	0
Indiana:			
Indianapolis	2	1	0
Illinois:			
Chicago	4	0	1
Michigan:			
Detroit	1	0	1
Wisconsin:			
Madison	0	0	1
Missouri:			
St. Louis	0	1	0
Nebraska:			
Omaha	0	0	1

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Maryland:			
Baltimore	3	0	0
Cumberland	1	0	0
Virginia:			
Richmond	1	0	0
North Carolina:			
Wilmington	1	0	0
South Carolina:			
Charleston	1	0	0
Florida:			
Tampa	1	0	0
Kentucky:			
Louisville	1	0	0
Tennessee:			
Memphis	0	1	0
Louisiana:			
New Orleans	1	1	1
Shreveport	0	2	0
Texas:			
Fort Worth	0	0	2
Houston	1	0	1
Washington:			
Seattle	0	1	0
California:			
Los Angeles	0	0	1

Encephalitis, epidemic or lethargic.—Cases: Baltimore, 1.

Pellagra.—Cases: Boston, 1; Raleigh, 1; Wilmington, N. C., 1; Atlanta, 1; Savannah, 4; Birmingham, 2; San Francisco, 1.

Typhus fever.—Cases: Montgomery, 1; Houston, 1.

FOREIGN AND INSULAR

CUBA

Habana—Communicable diseases—4 weeks ended June 5, 1937.—During the 4 weeks ended June 5, 1937, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	13	2	Scarlet fever	3	
Leprosy	1		Tuberculosis	24	3
Malaria	[1] 30	2	Typhoid fever	[1] 61	14
Poliomyelitis	[1] 5				

[1] Includes imported cases.

Provinces—Notifiable diseases—4 weeks ended May 29, 1937.—During the 4 weeks ended May 29, 1937, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer		1		8			9
Chicken pox		18	1	2		1	22
Diphtheria	1	15	2	3	2	1	24
Dysentery (amoebic)				1			1
Leprosy		3		2	1	4	10
Malaria	62	32	3	101	62	139	399
Measles			23			2	25
Poliomyelitis	1	6		1		1	9
Scarlet fever		3					3
Trachoma				1			1
Tuberculosis	34	15	37	77	29	31	223
Typhoid fever	12	64	21	50	20	46	213

JAMAICA

Communicable diseases—4 weeks ended June 12, 1937.—During the 4 weeks ended June 12, 1937, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		1	Leprosy		2
Chicken pox	4	55	Puerperal fever		3
Diphtheria	2	1	Tuberculosis	38	67
Dysentery	7	8	Typhoid fever	9	43
Erysipelas		1			

YUGOSLAVIA

Communicable diseases—4 weeks ended May 23, 1937.—During the 4 weeks ended May 23, 1937, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	28	3	Poliomyelitis	8	2
Cerebrospinal meningitis	57	16	Scarlet fever	255	2
Diphtheria and croup	498	32	Sepsis	9	4
Dysentery	17		Tetanus	35	17
Erysipelas	228	4	Typhoid fever	185	18
Measles	738	9	Typhus fever	136	11
Paratyphoid fever	21				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for June 25, 1937, pages 858-871. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued July 30, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

Siam.—A report dated June 2, 1937, from the American Consulate General at Bangkok, Siam, relative to the cholera epidemic in Siam, states that the number of new cases and deaths declined throughout May. A total of 1,301 new cases, with 780 deaths, was reported for the entire country from May 1 to May 30, as compared with 2,954 cases and 1,928 deaths for the preceding month.

Plague

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhau Sector.—A rat found June 17, 1937, in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory, has been proved plague-infected.

Smallpox

Uruguay.—During the week ended February 13, 1937, 1 case of smallpox was reported in Uruguay.

Typhus Fever

Chile—Iquique.—On May 19, 1937, 1 case of typhus fever was reported in Iquique, Chile.

China—Nanking.—During the week ended May 8, 1937, 3 cases of typhus fever were reported in Nanking, China.

Libya.—During the period May 21-31, 1937, 13 cases of typhus fever were reported in Libya.

Yellow Fever

Brazil.—Deaths from yellow fever have been reported in Brazil as follows: Minas Geraes State—Arary, Apr. 21, 1; Bom Successo, Apr. 29, 1. Para State—Santa Izabel, Apr. 21, 1 (first appearance). Sao Paulo State—Indaiatuba, Mar. 28, 1; Jundiai, Mar. 31, 1; Mogi das Cruzes, Apr. 17–18, 2 (first appearance); Parnaiba, Mar. 29, 1, Apr. 6, 1; Presidente Prudente, Apr. 20, 1; Presidente Wenceslau, Apr. 1–13, 6; Regente Feijo, Mar. 29–Apr. 10, 3; Santo Anastacio, Apr. 5, 1; Valparaizo, Mar. 18, 1 (first appearance).

Gold Coast.—On June 15, 1937, yellow fever was reported in Gold Coast as follows: 1 suspected fatal case at Accra, and 2 suspected fatal cases at Mepom.

Paraguay.—A dispatch dated June 4, 1937, from the United States legation in Asuncion, states that yellow fever has been officially reported in the Northwestern part of Paraguay. It was reported that arrangements had been made to renew the services of the Rockefeller Foundation, which the former Government had permitted to lapse.

Senegal—Linguere.—On June 17, 1937, 1 suspected case of yellow fever was reported in Linguere, Senegal.

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 52 JULY 9, 1937 NO. 28

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

May 23–June 19, 1937

The accompanying table summarizes the prevalence of 8 important communicable diseases based on weekly telegraphic reports from State Health Departments. The reports from each State are published in the Public Health Reports, under the section "Prevalence of Disease" The table shows the number of cases reported during the 4-week period May 23–June 19, 1937, and the median number for the corresponding period in the 5 years 1932–36, excepting for influenza, for which only four years, 1933–36, are used.

DISEASES ABOVE MEDIAN PREVALENCE

The number of reported cases of influenza, meningococcus meningitis, poliomyelitis, scarlet fever, and smallpox exceeded the median number reported for the corresponding period during the past 5 years.

Influenza.—The total number of reported cases of influenza was only slightly above the median number for the 4 preceding years. In the West South Central and Pacific regions the incidence was somewhat above the normal expectancy, but all other regions reported about the usual number of cases for this season of the year.

Meningococcus meningitis.—This disease was unusually prevalent in the South Atlantic and South Central regions. States reporting a relatively high incidence were Alabama (37 cases), Virginia (34), Kentucky and Tennessee (21 each), and North Carolina (18). While the number of cases for the country as a whole was considerably above the median number for the 5 preceding years, the reports show a very substantial reduction in the number of cases as compared with the corresponding period in 1936 and 1935.

Poliomyelitis.—The summer rise of poliomyelitis became apparent during the current period, but the incidence was about normal in all sections of the country except the South Central and Pacific. The highest incidence in those regions was reported from Mississippi (38 cases), California (21), Texas (15), and Tennessee (12); more than one half of the total cases occurred in those 4 States. In 1936 and

1935 the numbers of cases reported during this period for the entire reporting area were 89 and 240, respectively.

Smallpox.—The incidence of smallpox continued at a relatively high level. The excess number of cases was still confined to the North Central and Mountain regions. In the West South Central region the incidence dropped considerably below the 5-year median, while in other regions it stood at about the median level.

Scarlet fever.—Scarlet fever remained unusually prevalent in the North Central and West South Central regions; a slight excess in the number of cases over the average for recent years was reported from the Mountain region. Other regions reported about the normal incidence for this season.

Number of reported cases of 8 communicable diseases in the United States during the 4-week period May 23–June 19, 1937, with the median number of cases reported for the corresponding period, 1932–36

Division	Current period	5-year median	Current period	5-year median	Current period	5-year median	Current period	5-year median
	Diphtheria		Influenza [2]		Measles [3]		Meningococcus meningitis	
United States [1]	1,367	1,732	2,206	1,977	45,289	64,142	363	216
New England	46	65	6	12	3,589	6,842	15	12
Middle Atlantic	266	409	42	40	18,292	17,798	64	62
East North Central	297	407	314	362	12,999	27,920	51	79
West North Central	89	205	183	109	482	4,115	11	28
South Atlantic	181	206	402	484	4,157	4,378	95	20
East South Central	92	109	137	213	1,758	955	70	20
West South Central	213	210	704	573	1,738	1,070	33	15
Mountain	41	57	109	112	952	993	5	9
Pacific	142	132	309	174	1,322	4,861	19	14
	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
United States [1]	164	108	17,305	16,187	839	751	804	1,058
New England	5	7	1,425	1,377	0	0	14	29
Middle Atlantic	10	13	4,913	5,119	0	0	74	96
East North Central	13	16	6,567	5,569	166	88	93	133
West North Central	7	5	1,925	906	412	186	45	66
South Atlantic	16	12	472	639	3	4	179	328
East South Central	58	8	194	198	5	7	115	151
West South Central	31	7	508	193	41	92	220	159
Mountain	0	3	387	265	109	51	26	38
Pacific	24	14	914	952	103	123	38	55

[1] 48 States. Nevada is excluded and the District of Columbia is counted as a State in these reports.
[2] 44 States and New York City. The median is for the years 1933–36 only, the data for 1932 are not comparable.
[3] 46 States. Mississippi and Georgia are not included.

DISEASES BELOW MEDIAN PREVALENCE

The number of cases of diphtheria, measles, and typhoid fever for the total reporting area was below the median for the 5 preceding years. A comparison of the distribution of the cases by geographic regions shows, however, that the incidence of diphtheria in the Pacific

region, of measles in the Middle Atlantic and South Central regions, and of typhoid fever in the West South Central region was somewhat above the seasonal expectancy. Most of the other regions showed a relatively low incidence of these diseases.

MORTALITY, ALL CAUSES

The average mortality rate for large cities during the 4-week period ending June 19, based on data received from the Bureau of the Census, was 11.0 per 1,000 inhabitants (annual basis). The current rate was slightly below that for the corresponding period in each of the 2 preceding years, but it was approximately the same as the average rate for the years 1932–36.

SPONTANEOUS MAMMARY TUMORS IN MICE

Factors Influencing the Incidence of Metastases [1]

By L. L. Ashburn, *Passed Assistant Surgeon, United States Public Health Service*

Since 1931 an inbred colony of tumor-bearing white mice has been maintained in the Division of Pharmacology of this Institute. The strain was obtained from the State Institute for the Study of Malignant Disease, Buffalo, N. Y., through the courtesy of Dr. B. T. Simpson and Mr. M. C. Marsh. Rather detailed characteristics of this strain 3 were described by Marsh (1929).

The purpose of this report is to evaluate some of the factors influencing the incidence of metastasis from the spontaneous mammary tumors as shown by the accumulated clinical, autopsy, and histological data of 480 tumor-bearing female mice. The clinical and gross autopsy data were furnished by Medical Director Carl Voegtlin and Associate Pharmacologist J. W. Thompson, and for this help grateful appreciation is expressed.

The tumor-bearing mice were used for many different experimental studies, dealing mainly with tumor physiology. The diet was variously changed or supplemented over the 6-year period. The colony was searched every 5 to 10 days for new tumors, and when found, the mice bearing them were segregated into groups and tumor measurements were made twice weekly until death of the animal. Carefully performed autopsy was done in all cases and histological examinations were made on the tumor, heart, lungs, liver, kidney, spleen, and any enlarged lymph nodes. Very rarely one of the above organs was not present for examination, but no case is included in which tumor and lung were not examined microscopically.

[1] From the Division of Pathology, National Institute of Health.

Tumor histology and classification.—In the early part of the present century, when spontaneous mammary tumors of mice began to attract widespread interest, and lead to heated arguments over the question of malignancy, J. A. Murray (1908) described the tumor histology in great detail and so well that since that time histological description of these tumors is seldom repeated except in brief review. Marsh (1929), in dealing with this tumor, dismissed the description with little more than " * * * the familiar mammary tumor of a rich literature." Here the tumor will be very briefly described, mainly in reference to classification, in order that some of the data presented will be more readily understood.

The structure in this inbred tumor strain does not vary appreciably from that of other mouse strains. It is basically adenomatous, and the most undifferentiated areas can be traced by easy gradations from the hyperplastic breast lobule. Small, well-differentiated acini, larger and atypical acini or tubules, epithelial cysts of variable size, with or without true papillary proliferation, and solid cellular areas intergrading or well circumscribed are not infrequently seen in a single tumor. It is infrequent to find a tumor entirely glandular or solidly cellular, and for this reason histological classification is rather unsatisfactory. It would appear that an elaborate classification is not justified until more data are present on histogenesis of the tumor. In this study the classification of Apolant as given by Woglom (1913) is substantially followed. Adenoma malignum is used to designate those tumors composed of small acini evenly disposed throughout a loose fibrocellular stroma and lined by cubical epithelium showing only slight nuclear hyperchromasia and infrequent areas of stroma invasion. It is felt that the term adenocarcinoma would imply a degree of malignancy not in keeping with the histological appearance. As it is believed that the clinical malignancy of the tumor is affected little, if any, by the congested or focally hemorrhagic stroma, and, further, that this condition of the stroma is noted fairly frequently in noncystic tumors, Apolant's adenoma cysticum oedematosum s. haemorrhagicum and cysto-carcinoma haemorrhagicum are not used.

The six groups into which these tumors are divided are shown in table 6. Since, as previously stated, pure structure is rarely seen, the modification of the term adenocarcinoma by cyst or papillary does not mean that the tumor is largely cystic or papillary; rather it means the prominence of this structure in scattered or focal areas. There were a few tumors encountered in which acini were very rarely seen, the structure being almost solidly cellular. No especial designation was made for this group, since it is believed that these tumors arise from adenocarcinoma by dedifferentiation and simply represent the more malignant varieties. This theory is not new, but further evidence in support of it will be given under a subsequent heading. Two tumors

showing intimate relations of malignant acini and squamous structures were found. Metastases did not occur in either case.

Metastases.—In early studies of spontaneous mammary carcinoma, metastases were rarely seen. Bashford and Murray (1904), working with the Jensen tumor, failed to discover secondary deposits. The almost complete failure of these tumors to produce metastases furnished one of the strongest points for argument by those who maintained that the tumors were nonmalignant and that any results obtained with this growth could have no possible application to human cancer, and more particularly to human mammary-gland tumors. However, this objection was nullified when the above-mentioned workers, in collaboration with Cramer (1905), described pulmonary metastases in mice inoculated with the Jensen mammary carcinoma. Subsequent investigators found pulmonary metastases to be of common occurrence. Although tumor cells reach the lungs by blood stream, tumor thrombi are found in lymph vessels as well as blood vessels and focally in lung parenchyma without demonstrable relationship to larger vessels. In this series of cases among 45 lungs with secondary deposits in which the location of tumor nodules was noted, the following distribution was shown: Subpleural, 7; focal in pulmonary parenchyma, 7; peribronchial, 6; intravascular, 8; and in 17 cases various combinations of the above locations. The individual nodules vary in number and size and generally closely conform in structure to that of the primary tumor. Of 217 mice showing pulmonary metastases, 38, or 17.5 percent, were bulky, replacing the greater portion of the parenchyma of one or more lobes. This disagrees with the findings of Marsh (1927) that the disseminated pulmonary growths are usually few and small in this strain of mice.

Since it is true that metastases occur in lungs almost to the exclusion of other organs, and since many of the tumor foci are not visible macroscopically, the only way to arrive at a true incidence of metastasis would be to section serially the lungs of all tumor mice. This obviously is impractical, but has been done in a few cases. By this method Murray (1908) showed 8 positive in 16 grossly negative lungs, and Marsh (1927) found 9 positive in 13 grossly negative cases. In many reports the incidence of metastasis is based on gross findings and in some others on gross observation supplemented by microscopic examination of questionable cases. That reliance on gross examination alone leads to erroneous conclusions will be shown by data to be presented subsequently. Murray (1908) reports 39.6 percent pulmonary metastases in 68 tumor mice; Haaland (1911), 38 percent in 273 mice; and Marsh (1929), 39.1 percent in 314 mice.

TABLE 1.—*Metastases in lungs*

	Total number of tumor mice	Metastases—Lung	
		Number	Percent
Reported gross metastases, total	480	178	37.0
Spurious gross metastases	480	31	6.5
Gross metastases, unconfirmed microscopically	480	18	3.8
Metastases, microscopic; not seen in gross	480	70	14.6
Metastases, microscopic, total	480	199	41.5
Metastases, microscopic+unconfirmed gross	480	217	45.2

The incidence of metastasis in 480 tumor-bearing female mice is shown in table 1. Here only pulmonary metastases are considered, since in all cases where tumor masses were present in other locations, the lungs also showed secondary deposits. Macroscopically, 178, or 37.0 percent, were reported as positive. Of this number, some were definitely suspected of being focal lesions other than metastatic deposits but sufficiently suggestive to be reported as positive until proved spurious or confirmed by microscopic examination. On microscopic examination these 178 cases showed 31, or 17.4 percent, to be lung adenomata, lymphoid deposits, nonliquefied abscesses, small subpleural foci of bronchopneumonia, or other circumscribed inflammatory conditions. The 37 percent macroscopic metastases in this series is in close agreement with the findings of Murray, Haaland, and Marsh recorded above. It would not appear unjustifiable to assume that a certain number, possibly in the neighborhood of 17 percent, of reported pulmonary metastases are spurious. This would, of course, vary greatly, since the incidence of lung adenomata and lymphoid deposits in lung varies with different mouse strains; also inflammatory lesions would be affected by environmental factors. Haaland (1911) was fully aware of "false positive" and "false negative" findings when macroscopic examination alone was relied upon. He sectioned the suspicious pulmonary nodules and eliminated many false positives in this way. However, he did not investigate the macroscopically negative lungs.

Of the 178 gross positives, 147 were confirmed in sections. In addition, 70, or 14.6 percent, microscopically positive were found in grossly negative lungs, making a total of 199, or 41.5 percent, proved pulmonary metastases. In a few cases the pulmonary nodules seen in gross were single and quite small, and in sectioning were missed. These cases are shown in the table as unconfirmed gross metastases and are added to the microscopically proved cases so that comparison could be made with other reports based on gross examination alone. There were 18 such lungs, giving a total of 217, or 45.2 percent. It should be stated here that routine microscopic examination of lungs showed 48 (not separately tabulated) cases in which nothing was found

to account for the recorded positives. In these cases the gross material was reblocked and resectioned. In this way 16 positives and 14 spurious nodules were found. Of the latter, lung adenomata formed a considerable number. If the 18 remaining unconfirmed grossly positive cases were similarly divided, the true probable incidence would be 209, or 42.7 percent.

The list of factors influencing the occurrence of metastases is long, undoubtedly incomplete in many respects, and inaccurate in others. It is intended here to analyze the data to determine the effect, if any, of tumor size, tumor duration, tumor growth rate, tumor location, multiple tumors, and histological type on the tendency of the primary tumor to produce secondary deposits. Each will be discussed under appropriate headings.

TABLE 2.—*Relation of multiple primary tumors to incidence of lung metastasis*

	Total number of mice	Metastases	
		Number	Percent
Mice with 1 tumor	185	69	37.3
Mice with 2 tumors	153	71	46.4
Mice with 3 tumors	88	43	48.9
Mice with 4 tumors	34	20	58.8
Mice having 5 to 8 tumors	20	14	70.0

Multiple tumors and metastases.—The occurrence of multiple mammary tumors in mice was recorded by early investigators. The question of whether or not these multiple growths are actually primary and not metastatic is no longer a subject of dispute. The demonstration of Fischer (1919), by ink injection method, that the mouse mammae are independent structures leaves little room for doubt in most cases. The percentage of multiple tumors recorded by various authors is much lower than that observed by Marsh (1929). His figures show for strain 3 a multiple-tumor incidence of 51.7 percent, with 1.84 tumors per mouse. This compares with a 61.5 percent incidence, with 2.08 tumors per mouse in this series. This difference of approximately 10 percent in multiple-tumor incidence observed in two separate colonies of the same strain could be easily explained by the difficulty experienced in determining the presence of two or more tumors in the same breast area. Under these conditions Marsh states that a minimum number was recorded, and he feels that his figure is an understatement of the actual number. It seems probable that the tendency to form multiple tumors would increase with tumor incidence. On this basis the high multiple-tumor percentage could easily be explained for this strain, since over 90 percent of females develop tumors.

The presence of multiple tumors as a factor influencing the incidence of metastasis is shown in table 2. It is noted that mice with 1 tumor showed 37.3 percent metastases; mice with 2 tumors, 46.4 percent; mice with 3 tumors, 48.9 percent; mice with 4 tumors, 58.8 percent; and in mice having from 5 to 8 tumors, metastasis occurred in 70 percent of cases. From these figures the multiple-tumor factor is striking, metastases being approximately twice as frequent in mice with from 5 to 8 tumors as compared with mice with only one tumor. It is not suggested, nor is it to be inferred, that this approximately 100 percent increase in tumor metastases is entirely due to the multiple-tumor effect. It might be argued that, since age and size may be factors influencing metastasis, the multiple-tumor effect is only apparent and not real. When it is borne in mind that most carcinomatous females die of "tumor cachexia", and that this condition would naturally be hastened by increased tumor bulk (multiple tumors), age in this group should have little effect. That growth rate varies in tumors of different animals maintained on a nutritious diet and in multiple tumors of the same animal, but not significantly in an individual tumor, was shown by Voegtlin and Thompson (1936). Since, as a group, the growth rate of multiple tumors is no higher than the growth rate of single tumors, size of a individual tumor as a factor here must be discounted. The means by which the presence of multiple tumors increases the incidence of metastasis cannot be definitely ascertained; however, aggregate tumor bulk immediately suggests itself. Since metastases occur almost entirely by blood stream, the greater number of malignant cells in close association with blood vessels would naturally increase the opportunity for tumor emboli to occur. Again, multiple tumors of the same breast not infrequently lead to massive growths with considerable necrosis. Blood vessels are involved as well as tumor cells, and under this condition the opportunity for tumor cells to gain entrance to the vascular system is naturally enhanced. There are probably many factors concerned, but the statements just presented are suggested as a reasonable explanation.

Duration of tumor and metastases.—The term "tumor age" for many years has been used as meaning that period in the life of the mouse during which the tumor has its inception. Consequently, another term must be used when reference is made to the actual age of the tumor; and to avoid confusion, in this report "tumor duration" is used in that sense. To record the exact date when a tumor becomes palpable or grossly recognizable would require careful inspection of the entire mouse colony every one or two days. Where a large colony is kept, this becomes impractical and unnecessary. The colony furnishing the mice for this report was inspected every 7 to 10 days, the presence of tumors was noted, measurements were taken and the

animals were segregated. Occasionally tumors of moderate size were found, having developed since the last inspection or having been so small that they were missed. In an attempt to establish more accurately the tumor duration, it was decided to assign to each tumor a probable date on which it was of sufficient size to be grossly evident. This was done by establishing a growth rate factor based on a large number of tumors and using this figure in arriving at the date of appearance. Since growth rate varies in individual tumors, it is evident that the date of tumor appearance arrived at in this manner is not entirely accurate. However, since the same scheme was applied to all tumors, and since the number of tumors is fairly large, the error is widely distributed or balanced.

TABLE 3.—*Relation of duration of primary tumor to incidence of lung metastasis*

Duration of oldest tumor, in days	Total number of tumor mice	Metastases		Duration of oldest tumor, in days	Total number of tumor mice	Metastases	
		Number	Percent			Number	Percent
Under 10	2	0	0	61 to 70	53	31	60.7
11 to 20	29	6	20.7	71 to 80	37	22	59.5
21 to 30	69	20	29.0	81 to 90	30	19	63.3
31 to 40	68	26	38.2	91 to 100	13	9	69.2
41 to 50	81	28	34.6	Over 100	17	13	76.5
51 to 60	78	40	51.3				

That long duration of malignant growths greatly increases the incidence of metastasis is an opinion that must be as old as oncology itself. Yet in human tumors this is difficult to prove statistically, since it is quite difficult to rule out or evaluate other factors such as the intervention of treatment, surgical or otherwise. That the spontaneous mammary tumors of mice showed a much higher metastasis incidence when the mouse had kept these tumors for a long time was quite evident to Haaland (1911), and this knowledge was used by Pybus and Miller (1934) to explain the very small number of metastases in their mice, the majority of which had had surgical removal of the tumor in order that breeding might be continued. To show statistically this tumor duration effect, the animals of this series are divided into 11 groups (table 3). It is seen that the percent of metastases varies from 0, where the tumor duration was 10 days or less, to 76.5 percent in the group of mice having carried their tumors for 100 days or more. It is also evident that this metastasis incidence increases fairly regularly, corresponding to the increased tumor duration. It would be purely coincidence if in this table the cause and effect were more nearly correlated, for it is impossible completely to eliminate multiple-tumor and tumor-size factors and still have sufficient number of animals to be of significance. When more detailed analysis of the oldest tumor group (over 100 days) is compared with a similarly analyzed group of multiple tumors, the independent metas-

tasis-producing effect of tumor duration will be obvious. This is done under the following heading.

Tumor size and metastases.—The accurate determination of tumor size (bulk) can be determined only by careful dissection of the tumor at autopsy and weighing. Generally this procedure is unnecessary, since by making two dimensional measurements a quite satisfactory estimation of size is obtained. In a fairly large number of cases the tumor was weighed as well as measured. Comparison of the results showed that quite accurate size estimation was obtained by measurement, except in few instances where the tumor exhibited unusual shape. Where tumor size is referred to in this analysis, the figure given is the square root of the product of the two longest dimensions, in millimeters. Table 4 shows the mice divided into 7 groups according to size of the largest tumor. It is seen that the incidence of metastasis varies from 6.4 percent in mice with tumors 10 mm or less to 69 percent in cases where the tumors were from 30.1 to 35 mm. The progressive increase in metastasis incidence is fairly regular in the intervening groups according to the increased tumor size. In the last size group, namely, those mice which had tumors over 35.1 mm, metastases occurred in only 50 percent, as compared to 69 percent for the next smaller size group. It is to be shown later that the size of old tumors has less relationship to incidence of metastasis than does the age. It is suggested that the multiple-tumor and age factors are partially responsible for the higher percentage shown by the mice with tumors ranging in size from 25.1 to 35 mm.

TABLE 4.—*Relation of size of primary tumor to incidence of lung metastasis*

Size of largest tumor expressed as square root of product of two dimensions in mm	Total number of mice	Metastases	
		Number	Percent
10 or less	47	3	6.4
10.1 to 15	80	26	32.5
15.1 to 20	97	40	41.2
20.1 to 25	109	54	49.5
25.1 to 30	67	43	64.2
30.1 to 35	58	40	69.0
35.1 and over	22	11	50.0

That the higher incidence of metastasis in the last group of tables 2 and 3 is largely due to the independent factors stated, is evident when these groups are compared with reference to average number of tumors, average duration, and average size.

TABLE 5.—*Comparison of last group in tables 2, 3, and 4*

Group no.	Number of mice	Percent of metastases	Average number of tumors per mouse	Average duration of tumor, in days	Average tumor size
1 (mice with 5 to 8 tumors)	20	70 0	5 80	55 3	24.6
2 (mice with tumors of 100 or more days' duration)	17	76 5	2 53	118 0	25 4
3 (mice with tumor size of 35.1 or above)	22	50 0	2 46	61 6	57.7

Table 5 shows that in groups 1 and 2 the tumor size is approximately the same; group 1 has about twice as many tumors per mouse, and the tumor duration is less than half of that of group 2, yet in each group metastasis occurs in 70 percent or more of all mice. In comparing groups 2 and 3 it is seen that the number of tumors per mouse is approximately the same, and that in group 3 tumor duration is less than half that in group 2 and the tumors are almost twice as large. This shows first, that size *per se* has slight influence on metastasis incidence, giving 50 percent in this selected group whereas the entire 480 mice showed 45 percent metastases. Also from this comparison it is seen that large tumors are not included in groups 1 and 2, and that the high metastasis rate is due in the first group to the multiple tumors and in the second to long tumor duration.

Growth rate and metastases.—In this analysis, multiple tumor effect is eliminated by considering only mice with one tumor. There are 185 such mice, and in figure 1 each mouse is plotted according to duration of tumor in days and size, as indicated in graph. Mice having metastases are indicated by ×, and 0 represents mice without metastases. It is seen that the median growth rate of tumors in mice with metastases is generally well above that of tumors which produce no metastases, except in those mice which had carried their tumors for 70 days or longer.

For further analysis the median tumor growth rate for all 185 mice was established (curve not shown), and comparison was made with reference to metastases in the mice above and below this median growth rate curve. This shows 41, or 49.4 percent, metastases in 83 mice with tumors above, and 28, or 30 4 percent, metastases in 92 mice with tumors below this median growth rate. Further division of this group according to tumor duration shows that, in mice having had their tumors less than 50 days, metastases occurred in 36.6 percent of 41 mice with tumors above the mean and in only 18 percent of 50 mice below the mean. In those mice having had their tumors for 50 days or more, metastases occurred in 61.9 percent of 42 mice with tumors above the mean and in 45.2 percent of 42 mice with tumors below the mean growth rate. It is evident from these figures that, as a group, the higher the growth rate the higher the incidence of metastases, and that this is particularly true in younger tumors

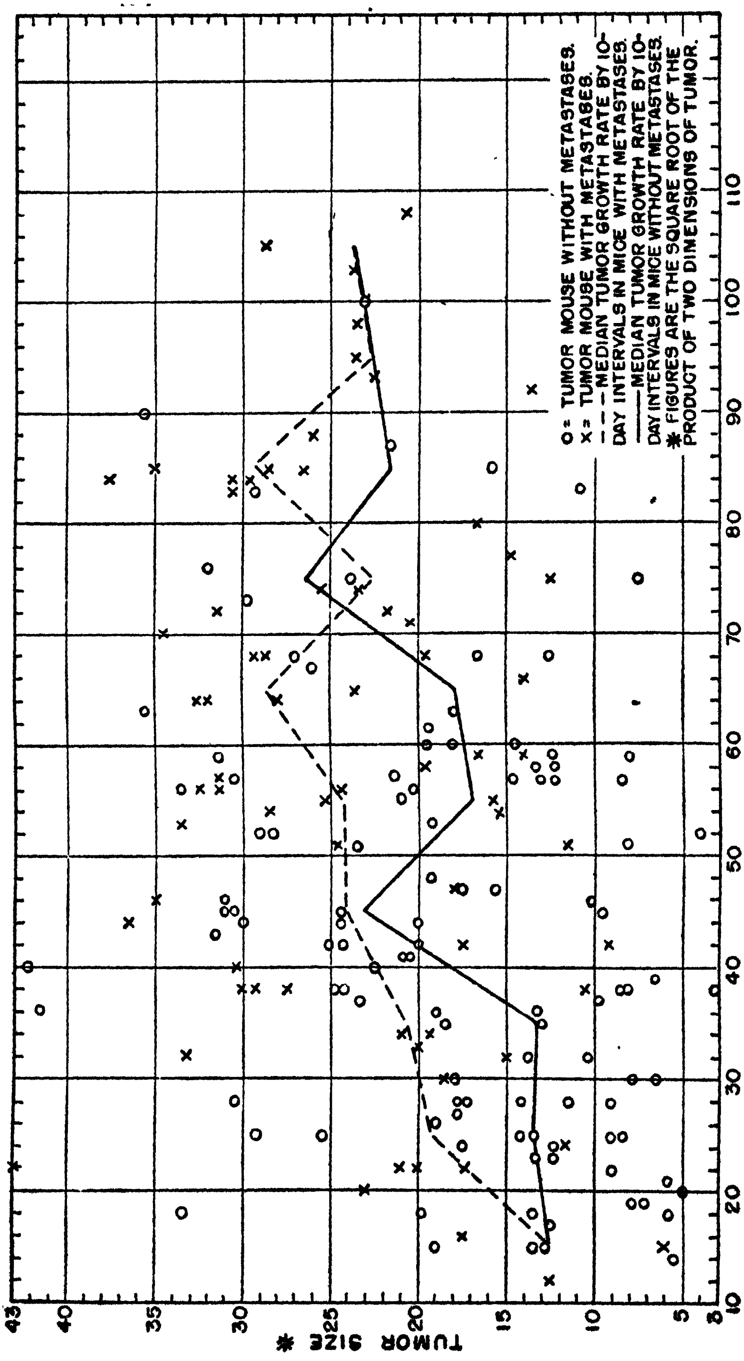

FIGURE 1.—Comparison of median tumor growth rates in mice showing metastases with rates in those without metastases (all with one tumor).

(less than 50 days). The effect of age of the tumor is quite clear, since in the older tumors (50 days or more) metastases were only slightly less frequent in the small tumor group (below mean).

TABLE 6.—*Number and percentage of lung metastases by histologic classification of tumors*

Tumor type	Total number of single tumor mice	Metastases	
		Number	Percent
Adenoma	7	[1] 2	
Cystadenoma	2	0	0
Adenoma malignum	10	1	10
Papillary cystadenocarcinoma	33	8	24 2
Adenocarcinoma	102	42	41 2
Cystadenocarcinoma	31	16	51 6

[1] Gross, not found microscopically.

Metastases and histological classification.—As previously stated, and shown in table 6, the tumors are divided into 6 groups histologically. The basis for such separation was discussed under tumor histology. Of the 185 single-tumor mice shown, metastases occurred in 51.6 percent, 41.2 percent, 24.2 percent, and 10 percent in cystadenocarcinoma, adenocarcinoma, papillary cystadenocarcinoma, and adenoma malignum groups, respectively. This table indicates that the cystadenocarcinomas are clinically more malignant than the adenocarcinomas and the papillary tumors. This is contrary to the opinion held by some investigators. Haaland (1911) points out that histological evidence of malignancy is not always in keeping with the clinical evidence. One gains this impression by seeing many histologically quite malignant tumors which fail to produce metastases and other tumors of rather benign appearance producing secondary deposits. The last observation may be explained by the fact that a single section may pass through a benign adenomatous area, whereas quite active proliferation may be present in other portions of the tumor. As previously stated, these tumors are basically the same growth, and classification is often difficult and unsatisfactory. The mere presence of short papillae in one or few cysts probably does not justify placing the tumor in a separate group, for papillary proliferation is usually seen in a limited area and is rarely complex. If in table 6 the two groups of cystic tumors are combined, then metastases occur in 37.5 percent of the 64 mice, which is not materially different from that found in the noncystic but otherwise similar tumors. The writer feels that this latter grouping is justified and that no real difference in clinical malignancy exists by this classification, except, of course, between the obviously malignant, the borderline, and the benign groups.

That the diffusely cellular (solid) areas that occur in many of these tumors is an indication of increased malignancy is evident histologically. The cells are large, polygonal, nuclei are increased in size, are more hyperchromatic and show many more mitotic figures than seen in the adenomatous structures. This is in agreement with the findings in human tumors of glandular origin, namely, that when tumor cells fail to produce structures similar to those from which they arose, the clinical malignancy progresses inversely as this differentiating ability is lost. To find out whether this were true in spontaneous mammary tumors of mice, 185 single-tumor mice were divided into two groups. In 126 mice with tumors of relatively pure glandular structure, metastases occurred in 29, or 23 percent, whereas in 59 mice whose tumors showed solidly cellular areas of varying extent, metastases occurred in 24, or 40.7 percent. This 77 percent increase in tumor metastases is, of course, too great to be explained on any coincidental factors. Further division of the 59 mice according to degree of diffuse cellularity resulted in groups too small to be of significance. The argument favoring the origin of the solid areas from adenomatous structures, rather than the reverse, would appear to be greatly strengthened by the above findings.

Tumor location and metastases.—Williams, Silcox, and Halpert (1935), in working with tumor mice from the "Albino A stock," of Strong, found no correlation between tumor location and incidence of metastasis. This finding is confirmed in this study of a different mouse strain (strain 3, Marsh, 1929). In 87 mice with single tumors of the cephalic half of the body, metastases occurred in 35, or 40.2 percent, and in 98 mice with tumors of caudal half, metastases were found in 35, or 35.7 percent.

Metastases to organs other than lungs.—All investigators are agreed that secondary deposits in organs other than the lung occur quite infrequently. In 68 tumor mice, Murray (1908) records metastatic tumor nodules once in liver and three times in lymph nodes, two of which were found as a result of serially sectioning five mice. In 273 mice, Haaland (1911), found other than pulmonary metastases 14 times in the following locations: Liver, 4; on peritoneum, 3; lymph node, 2; and one each in kidney, ovary, retroperitoneum, under diaphragm, and in spleen. Just how many mice were involved was not stated. In many reports no statement is made that would indicate the occurrence of nonpulmonary metastases.

In 480 mice here reviewed, 5 showed 10 nonpulmonary metastases. Heart and kidney were involved once; liver, spleen, and kidney once; heart twice; spleen and kidney once; and liver alone once. All of the 5 mice also had secondary deposits in lungs. In addition, there were 4 other mice that showed tumor thrombi of the right ventricle, and in 1 a large tumor mass was present just distal to the pulmonary valve.

Of the 4 cardiac thrombi, the largest was approximately 1.5 by 3 mm, and was much more malignant histologically than the primary tumor. In 1 case the thrombus was attached to the endocardium by a slender fibrocellular connective tissue strand. In the other 3 cases the tumor masses appeared to lie free in the ventricle cavity. The main reason for considering the tumor masses as thrombi rather than emboli is their large size in comparison with the relatively small efferent vessels of the tumor. A single section of heart could quite easily fail to pass through the area of attachment. Pearce and Brown (1923), in reporting on metastases of a transplantable rabbit carcinoma, stated: "In few instances masses of tumor cells were found in the right auricle or ventricle apparently free, or attached to the walls of the heart by a slender pedicle." Warren and Gates (1936), working with transplantable rat carcinoma, found 2 cases in which tumor was growing free in chambers of the heart and extending into cardiac muscle. In reviewing the literature on tumor metastases in mammary carcinoma of mice, Haaland's case (1911) of cardiac involvement was the only one found; and in this, tumor cells from a lung metastasis grew through the vessels into the heart and floated free in the blood stream.

Tumors or tumorlike diseases other than mammary carcinoma.—Marsh (1929), in giving the general characteristics of this mouse strain states: "* * * the progeny is rather narrowly restricted in cancer tendency and produces little else than the epithelial tumor of the mammary gland in the female." Figures showing the actual occurrence of other tumors were not given. Pybus and Miller (1934), working with the same mouse strain, are in agreement with this statement by Marsh. They found 26 primary lung tumors in 587 mice, 4 occurring among 168 carcinomatous females. Eight sarcomata and one hemangioma were also found. Fifty-eight mice showed "leukemia" involving the lymphatic system, and of this number 37 were females, 9 of which had mammary tumors.

In this series of 480 carcinomatous females, lung adenomata were found in 6. All of these were discovered on reembedded and resectioned material of 48 mice, nothing having been found in the original sections. This would indicate that the primary lung tumors are much more frequent than shown by the above figure, the usually small size of the tumor being responsible for the error. The only other tumor conditions found were those involving the lymphatic system. Six carcinomatous females, 2 noncarcinomatous females, and 1 male were affected. Leukemic infiltration of lung, liver, and spleen occurred twice; similar infiltration of the same organs and the heart in addition, once; retroperitoneal lymphosarcoma occurred once; generalized lymphosarcoma twice; mediastinal lymphosarcoma once and pseudoleukemia once. The classification of the lymphatic diseases used

above is admittedly unsatisfactory and may not indicate the true picture of the disease in each case. This is due to the fact that inadequate material was present for examination in many of these cases and blood smears were examined in only one.

DISCUSSION AND SUMMARY

The data showing the influence of certain factors on incidence of metastasis were discussed under the individual headings in order that it might be followed more readily. In most cases the conclusions drawn are not new, but the evidence presented places them on a sound statistical basis. The following is a brief summary:

1. Material furnishing the basis of this report represents the clinical, autopsy, and histologic data from 480 female mice with spontaneous mammary carcinoma. The mice belong to strain 3 developed at the State Institute for the Study of Malignant Disease in Buffalo, N. Y.
2. Tumor histology is briefly described, mainly with reference to classification.
3. Metastases occurred in 217 (45.2 percent) of 480 mice.
4. Multiple tumors occurred in 61.5 percent of mice, with an average of 2.08 tumors per mouse.
5. The incidence of metastasis is higher in mice having multiple tumors and in mice with tumors of long duration than in mice with single or small tumors.
6. Tumor size *per se* has little effect on the incidence of metastasis; this is especially true with reference to tumors of long duration. Rapidly growing tumors metastasize early and frequently.
7. Tumors showing diffuse, undifferentiated cellular areas metastasize more frequently than those of relatively pure glandular structure.
8. Very little, if any, difference in clinical malignancy is seen between the histological groups usually used to subdivide these mammary carcinomas.
9. Location of primary growth has little, if any, effect on tendency to produce metastases.
10. Nonpulmonary metastases are infrequent; location and number are given.
11. Tumors other than those of mammary origin are relatively infrequent. Those found were lung adenomata and tumors of lymphatic apparatus.

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TYPHOID OUTBREAK TRACED TO A SPORADIC CARRIER WITHOUT CLINICAL HISTORY OF THE DISEASE

Dr. John L. Lavan, health officer of Grand Rapids, Mich., has recently issued an interesting epidemiological report on an outbreak of typhoid fever in Grand Rapids which was traced to the eating of cream puffs from a bakery in which a temporary carrier of typhoid bacilli was discovered.

Between December 9, 1936, and January 4, 1937, 9 cases of typhoid fever were reported in the city, 4 cases in nearby territory, and at least 1 case in a town 21 miles distant. In the latter case the patient reported that she had eaten cream puffs from the bakery in which the carrier was found.

Doctor Lavan states that the city had been remarkably free from typhoid fever for the past 5 or 6 years, and that an epidemiological investigation was begun immediately after the first cases were reported. The occurrence of several cases within a period of two weeks pointed to a common origin. The milk used by the patients was found to have been supplied by five different dairies, although in the case of two dairies two patients were taking milk from the same dairy and one other dairy had supplied three of the patients. All of the dairies had pasteurizing plants and none sold raw milk. The results of the investigations of the pasteurizing methods and personnel were negative. The water supply was also found to be entirely safe.

After eliminating the milk and water supplies, attention was turned to other possible common sources of infection, and it was found that all of the patients in the city and some in the country had patronized the same bakery and that each of them had eaten cream puffs purchased therefrom. All of the employees, some 250 in number, were examined, their past history with reference to typhoid was obtained, cultures were made from stool samples, and the sanitary methods of certain employees were investigated. Cultures of stool specimens were made daily on the employees under suspicion, and on the seventh day a positive culture was obtained from an individual employed in filling the cream puffs with custard and whipped cream. Suspicion had been centered on this part of the industry early in the investigation, and production had been curtailed before finding the carrier.

The carrier is evidently of the temporary or sporadic type, as the organisms were not found to be present continuously in the stools, and she was without clinical history of having had the disease.

PREVENTING TYPHOID AND BACTERIAL FOOD POISONING FROM CREAM-FILLED PASTRY

In an outbreak of typhoid fever like that reported in the preceding brief note, or an outbreak of food poisoning such as that recently reported by Dr. J. C. Geiger,[1] director of public health of San Francisco, the immediate problem is to determine the source of infection. In both of these outbreaks the health officer, through prompt and persistent epidemiological inquiry, soon located the origin, and, in the case of the typhoid epidemic, eliminated the responsible factor and prevented further spread of the disease. The important permanent problem is the prevention of future outbreaks.

With reference to bacterial food poisoning from cream-filled pies and cakes, the following is taken from the Weekly Bulletin of the California Department of Public Health for August 15, 1936 (quoted from the San Diego Health Department Bulletin):

"During the months of June, July, August, and September, there occur many outbreaks of bacterial food poisoning in localities scattered over the entire United States. Several outbreaks have occurred in California and some in San Diego during the past years.

"The poisoning is caused by an excessive growth of bacteria in cream fillings and decorations, cream cakes, cold mixed custards, whipped cream products, eclairs, and other foods of this kind. In the hot months the temperature produces rapid multiplication of bacteria in foods which have become infected through production, handling, or distribution.

[1] Public Health Reports, June 11, 1937, p. 705.

"The health-department is endeavoring to stamp out this needless sickness by requiring the proper refrigeration and care of this type of bakery product from the time of production until it is ultimately consumed.

"The consumer and the public can be of valuable assistance to the health department by insisting upon the proper refrigeration and care of the foods they purchase and by refusing to buy or to be served with any cream- or custard-filled or decorated products unless they are at the time under proper refrigeration and care.

"The purchaser who buys such food to be consumed at home or elsewhere should place the goods under refrigeration at once. This kind of food should not be transported in an automobile for any considerable distance, such as to picnics, trips to the back country, and the like, unless adequate refrigeration is provided. The temperature in the automobile will incubate bacteria. An otherwise harmless pie may be the cause of serious illness.

"Report at once to the health department any case of food poisoning or so-called 'ptomaine' that may occur in your family or among your friends. Immediate investigation will be made to determine the causative agent and eliminate the possibility of further danger from the same source.

"Several localities, including San Francisco, Madera County, and others, have decreed that this class of merchandise may not be manufactured or sold during the summer months. San Diego has not taken such drastic action. With the cooperation of the baking industry, the general public, and merchants dealing in these products a satisfactory control may be established. Such cooperation must be close and wholehearted.

"The San Diego Health Department has established rules and regulations for the proper manufacture and care of cream and custard food products, copies of which have been freely distributed and explained to the trade. Any person desiring a copy of these regulations for their own guidance and information may obtain it by calling at the office of the local health department."

Under date of April 10, 1936, the following regulations governing custard fillings for pastries were promulgated by the California State Board of Health:

"WHEREAS poisoning with the toxins of staphylococci and colon group present in foods is becoming more common, the protection of the public health requires that products subject to such contamination be prepared with due regard to the prevention of such accident; therefore, be it

"*Resolved* that:

"1. All commercially prepared custards or cream fillings of pastries shall be made under conditions of cleanliness involving all stages of its manufacture.

"2. Only efficiently pasteurized milk may be used.

"3. The temperature and time of heating the mix shall be, as a maximum, the equivalent of a temperature of 140° F. for a period of one hour, provided, however, that other temperatures and times may be used when specifically approved by the Director of Public Health.

"4. Upon completion of the cooking of the custard when used for filling of eclairs or cream puffs or closed shell, that same should be put into shallow sterilized containers and chilled without delay to 50° F. When custard fillings are used in open shells, that the pie and the shell must be cooled likewise to 50° F.

"5. Custards must be kept in the cooling room until used in making pastries.

"6. The filling apparatus which shall be wholly of metal or rubber, cleaned with boiling water and sterilized brushes, or with a jet of live steam under pressure.

"7. Before use, filling apparatus shall be sterilized bv either boiling for 10 minutes, or steaming in a steam sterilizer for 1 hour.

"8. The manufacturer of custard-filled pastry shall prohibit any person suffering from a skin infection from preparing or handling in any manner such pastry or the custard mix used therein.

"9. Only freshly made cream filling shall be used in each batch.

"10. During the process of distribution, all pastries containing cream fillers shall be maintained at a temperature that will not produce spoilage. (For its information value, it may be stated that scientific investigation has shown 50° F. to be the maximum temperature.)"

DEATHS DURING WEEK ENDED JUNE 19, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended June 19, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	7,517	7,736
Average for 3 prior years	7,696	
Total deaths, first 24 weeks of year	226,409	222,964
Deaths under 1 year of age	458	506
Average for 3 prior years	537	
Deaths under 1 year of age, first 24 weeks of year	13,051	13,878
Data from industrial insurance companies:		
Policies in force	69,874,140	68,692,630
Number of death claims	12,579	12,132
Death claims per 1,000 policies in force, annual rate	9.4	9.2
Death claims per 1,000 policies, first 24 weeks of year, annual rate	10.8	10.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 26, 1937, and June 27, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 26, 1937	Week ended June 27, 1936	Week ended June 26, 1937	Week ended June 27, 1936	Week ended June 26, 1937	Week ended June 27, 1936	Week ended June 26, 1937	Week ended June 27, 1936
New England States:								
Maine	1				21	218	0	0
New Hampshire					27	26	0	0
Vermont	1				2	146	0	0
Massachusetts	6	5			417	582	3	2
Rhode Island	1	1			43	3	1	0
Connecticut	9		1	2	65	49	2	0
Middle Atlantic States:								
New York	45	34	[1] 2	[1] 4	1,020	1,476	7	15
New Jersey	6	7	3	6	700	364	3	1
Pennsylvania	17	25			1,332	1,134	15	5
East North Central States:								
Ohio	18	20	8	6	1,634	459	4	3
Indiana	5	5	3	8	301	10	1	3
Illinois	42	39	9	28	438	28	1	7
Michigan	23	12			288	50	2	1
Wisconsin	7	2	15	11	40	159	1	0
West North Central States:								
Minnesota	1	5	1	1	2	123	0	3
Iowa [2]	3	2	1		11	3	0	2
Missouri	6	15	23	8	26	20	0	1
North Dakota	2		219			6	1	0
South Dakota	1				2		0	0
Nebraska		2			8	8	0	0
Kansas	14	2	1	9	13	7	2	1
South Atlantic States:								
Delaware		3			3	9	0	1
Maryland [2,3]	5	5		1	93	211	1	2
District of Columbia	7	5			43	133	1	0
Virginia [2]	5	4			117	46	2	9
West Virginia	3	7	5	11	43	12	1	3
North Carolina [2]	15	13		8	378	5	2	4
South Carolina [4]		4	52	41	63	11	0	0
Georgia [4]	3	7					0	3
Florida [4]	7		1	2		7	1	2

See footnotes at end of each table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 26, 1937, and June 27, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended June 26, 1937	Week ended June 27, 1936	Week ended June 26, 1937	Week ended June 27, 1936	Week ended June 26, 1937	Week ended June 27, 1936	Week ended June 26, 1937	Week ended June 27, 1936
East South Central States:								
Kentucky [4]	3	10	3	3	301	21	3	9
Tennessee	3	1	13	17	75	13	1	2
Alabama [4]	10	8	6	7	36	7	10	2
Mississippi [3]	5	5					0	0
West South Central States.								
Arkansas		4	4	3	7		1	0
Louisiana	12	4	26	14	3	3	1	2
Oklahoma [5]	2	4	27	8	20	4	0	1
Texas [4]	32	20	66	59	273	100	0	4
Mountain States:								
Montana [2]		2		12	11	4	0	1
Idaho	2		1		20	13	0	0
Wyoming [2]	2				2	1	0	0
Colorado		3			46	10	1	5
New Mexico	5	1		1	31	39	0	0
Ariozna	2	2	15			97	0	1
Utah [1]					65	3	0	0
Pacific States								
Washington	1			1	74	133	1	1
Oregon [2]	1	1	6	10	2	14	0	0
California	31	20	10	466	162	1,201	4	8
Total	364	309	521	747	8,288	6,968	73	104
First 25 weeks of year	11,359	12,398	272,576	137,897	218,508	250,647	3,648	5,328

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 26, 1937	Week ended June 27, 1936	Week ended June 26, 1937	Week ended June 27, 1936	Week ended June 26, 1937	Week ended June 27, 1936	Week ended June 26, 1937	Week ended June 27, 1936
New England States:								
Maine	0	0	7	11	0	0	0	1
New Hampshire	0	0	5	1	0	0	0	0
Vermont	0	0	1	4	0	0	0	0
Massachusetts	1	0	152	143	0	0	2	5
Rhode Island	0	0	24	27	0	0	0	0
Connecticut	0	0	64	22	0	0	2	2
Middle Atlantic States.								
New York	3	3	272	292	0	2	12	13
New Jersey	0	0	58	106	0	0	0	7
Pennsylvania	0	1	709	223	0	0	12	13
East North Central States.								
Ohio	2	1	169	121	4	0	10	7
Indiana	1	0	32	37	6	3	4	5
Illinois	1	3	247	262	9	27	7	2
Michigan	0	1	431	228	1	1	1	6
Wisconsin	1	0	143	173	2	6	4	2
West North Central States:								
Minnesota	1	0	58	122	10	11	0	0
Iowa [2]	0	0	55	61	18	8	0	1
Missouri	1	0	22	67	3	11	0	18
North Dakota	0	0	48	13	11	5	1	0
South Dakota	0	0	6	11	1	3	2	0
Nebraska	0	0	5	26	8	24	0	0
Kansas	1	1	34	68	3	11	3	1
South Atlantic States:								
Delaware	0	0	1	2	0	0	0	0
Maryland [2] [3]	0	0	14	19	0	0	4	2
District of Columbia	0	0	9	6	0	0	3	0
Virginia [2]	3	0	2	12	0	1	13	8
West Virginia	0	0	28	8	1	0	2	4
North Carolina [2]	6	1	9	11	0	1	7	12
South Carolina [4]	1	1	2		0	0	26	10
Georgia [4]	1	0	8	4	0	0	30	23
Florida [4]	1	2	2	1	0	0	1	1

See footnotes at end of each table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended June 26, 1937, and June 27, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended June 26, 1937	Week ended June 27, 1936	Week ended June 26, 1937	Week ended June 27, 1936	Week ended June 26, 1937	Week ended June 27, 1936	Week ended June 26, 1937	Week ended June 27, 1936
East South Central States:								
Kentucky [4]	2	0	15	12	0	0	20	11
Tennessee	[6] 7	0	3	5	0	2	16	18
Alabama [4]	5	7	4	3	0	0	8	20
Mississippi [2]	18	0	5	6	0	0	11	21
West South Central States:								
Arkansas	7	0	8	-------	0	0	27	8
Louisiana	2	1	5	-------	0	0	9	20
Oklahoma [5]	8	0	9	-------	2	1	12	6
Texas [4]	0	2	59	32	3	0	26	15
Mountain States:								
Montana [2]	0	0	13	22	23	47	3	1
Idaho	0	0	13	5	4	3	1	3
Wyoming [2]	0	0	2	3	1	1	0	0
Colorado	0	0	8	13	1	0	2	3
New Mexico	0	0	11	13	0	1	2	10
Arizona	0	0	5	8	0	0	5	6
Utah [3]	0	0	12	6	0	0	1	0
Pacific States:								
Washington	0	1	25	30	1	3	0	8
Oregon [2]	0	0	23	26	3	2	2	5
California	9	7	100	109	26	1	10	17
Total	82	32	2,937	2,464	141	175	301	310
First 25 weeks of year	657	462	155,134	168,642	7,219	5,410	3,370	3,430

[1] New York City only.
[2] Rocky Mountain spotted fever, week ended June 26, 1937, 18 cases, as follows: Iowa, 3; Maryland, 1; Virginia, 4; North Carolina, 4, Montana, 1; Wyoming, 4, Oregon, 1.
[3] Week ended earlier than Saturday.
[4] Typhus fever, week ended June 29, 1937, 65 cases, as follows South Carolina, 1; Georgia, 31, Florida, 6, Kentucky, 1, Alabama, 18; Texas, 8.
[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa.
[6] One nonparalytic case included.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
March 1937										
California	36	117	9,024	7	781	9	7	1,241	77	22
May 1937										
Georgia	10	22	198	526	33	51	1	48	1	26
Hawaii Territory	2	14	20	[1] 2	2,123	-------	0	-------	0	0
Illinois	17	141	169	10	1,454	-------	4	2,596	95	15
Kansas	4	23	17	-------	140	1	0	718	41	7
Louisiana	5	49	52	79	32	19	2	61	0	53
Nebraska	9	5	2	-------	117	-------	0	248	17	0
Oklahoma	9	42	158	39	333	20	4	137	21	23
Rhode Island	4	2	-------	-------	660	-------	0	249	0	1
South Carolina	-------	108	760	977	384	189	1	10	1	11
Tennessee	22	37	272	55	495	57	3	71	0	20
Texas	28	200	1,504	2,448	4,253	279	6	705	42	79
Washington	5	14	6	-------	241	-------	3	142	24	6

[1] Off shipping.

March 1937

	Cases
California:	
Chicken pox	5,340
Dysentery (amoebic)	8
Dysentery (bacillary)	22
Encephalitis, epidemic or lethargic	1
Food poisoning	84
German measles	153
Granuloma, coccidioidal	6
Jaundice, epidemic	10
Leprosy	3
Mumps	3,848
Ophthalmia neonatorum	2
Paratyphoid fever	4
Rabies in animals	235
Septic sore throat	9
Tetanus	6
Trachoma	14
Trichinosis	1
Tularaemia	2
Typhus fever	2
Undulant fever	14
Whooping cough	2,716

May 1937

	Cases
Actinomycosis:	
Hawaii Territory	1
Anthrax:	
Louisiana	1
Chicken pox:	
Georgia	220
Hawaii Territory	77
Illinois	1,903
Kansas	281
Louisiana	22
Nebraska	156
Oklahoma	170
Rhode Island	87
South Carolina	119
Tennessee	238
Texas	2,020
Washington	644
Conjunctivitis:	
Georgia	1
Hawaii Territory	3
Oklahoma	1
Washington	6
Dengue:	
Texas	6
Diarrhea:	
South Carolina	736
Dysentery:	
Georgia (amoebic)	19
Georgia (bacillary)	35
Hawaii Territory (amoebic)	3
Hawaii Territory (bacillary)	2
Illinois (amoebic)	4
Illinois (amoebic carriers)	17
Illinois (bacillary)	26
Kansas (bacillary)	2
Louisiana (amoebic)	6
Oklahoma	13
South Carolina	2
Tennessee (amoebic)	2

May 1937—Continued

	Cases
Dysentery—Continued	
Tennessee (bacillary)	13
Texas (amoebic)	6
Texas (bacillary)	125
Encephalitis, epidemic or lethargic:	
Illinois	5
Kansas	4
Louisiana	1
Tennessee	1
Texas	8
Washington	2
German measles:	
Illinois	68
Kansas	13
Rhode Island	43
Tennessee	66
Washington	21
Hookworm disease:	
Georgia	1,292
Hawaii Territory	17
Louisiana	39
Oklahoma	2
South Carolina	70
Impetigo contagiosa:	
Hawaii Territory	6
Kansas	1
Oklahoma	2
Tennessee	1
Jaundice, infectious:	
Hawaii Territory	6
Leprosy:	
Hawaii Territory	7
Louisiana	1
Mumps:	
Georgia	223
Hawaii Territory	65
Illinois	1,085
Kansas	704
Louisiana	2
Nebraska	59
Oklahoma	53
Rhode Island	14
South Carolina	66
Tennessee	233
Texas	1,316
Washington	530
Ophthalmia neonatorum:	
Illinois	4
Kansas	1
South Carolina	7
Tennessee	4
Paratyphoid fever:	
Hawaii Territory	1
Illinois	2
Louisiana	3
South Carolina	1
Texas	4
Puerperal septicemia:	
Georgia	3
Tennessee	3
Washington	1
Rabies in animals:	
Illinois	46
Louisiana	22
Rhode Island	4
South Carolina	47

May 1937—Continued

	Cases
Rabies in animals—Con.	
Texas	14
Washington	32
Scabies:	
Oklahoma	3
Septic sore throat:	
Georgia	27
Illinois	13
Kansas	2
Louisiana	1
Nebraska	1
Oklahoma	64
Rhode Island	4
Tennessee	11
Washington	1
Tetanus:	
Hawaii Territory	2
Illinois	3
Kansas	3
Louisiana	2
Oklahoma	1
Tennessee	2
Trachoma:	
Hawaii Territory	7
Illinois	26
Oklahoma	5
Tennessee	32
Trichinosis:	
Georgia	1
Tularaemia:	
Georgia	3
Illinois	2
Kansas	4
Louisiana	1
Oklahoma	2
Tennessee	2
Texas	5
Typhus fever:	
Georgia	57
Hawaii Territory	1
Texas	42
Undulant fever:	
Georgia	8
Illinois	12
Kansas	7
Louisiana	3
Oklahoma	32
Rhode Island	2
Tennessee	1
Texas	16
Washington	2
Vincent's infection:	
Illinois	26
Kansas	3
Oklahoma	1
Tennessee	15
Whooping cough:	
Georgia	209
Hawaii Territory	17
Illinois	764
Kansas	315
Louisiana	50
Nebraska	63
Oklahoma	53
Rhode Island	142
South Carolina	248
Tennessee	460
Texas	2,092
Washington	384

PLAGUE INFECTION IN FLEAS TAKEN FROM CHIPMUNKS NEAR LAKE TAHOE, CALIF.

Under date of June 28, 1937, Dr. W. M. Dickie, director of public health, California, reported that a guinea pig, inoculated June 17 with a suspension prepared from 70 fleas collected on June 10 from 107 chipmunks (*Eutamias* sp.) from the eastern region of Carnelian Bay, Lake Tahoe, Calif., died on June 22 with typical lesions of plague. This locality is near that in which a patient developed plague last year.[2]

WEEKLY REPORTS FROM CITIES

City reports for week ended June 19, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	179	68	24	4,325	433	1,380	12	404	49	1,294	-------
Current week [1]	140	37	21	3,072	356	1,266	20	384	32	1,284	-------
Maine:											
Portland	0	-----	0	0	2	1	0	1	0	1	25
New Hampshire:											
Concord	0	-----	0	0	1	1	0	0	0	0	7
Manchester	0	-----	0	0	1	2	0	0	0	0	20
Nashua	0	-----	0	0	0	2	0	0	0	0	-------
Vermont:											
Barre	0	-----	0	0	0	0	0	1	0	0	2
Burlington	0	-----	0	0	0	0	0	0	0	0	10
Rutland	0	-----	0	0	0	0	0	0	0	0	4
Massachusetts:											
Boston	0	-----	1	22	16	24	0	10	1	18	186
Fall River	0	-----	0	37	2	1	0	1	0	6	29
Springfield	0	-----	0	3	0	2	0	2	0	11	42
Worcester	0	-----	0	14	2	1	0	1	0	17	36
Rhode Island:											
Pawtucket	0	-----	0	0	0	0	0	0	0	0	14
Providence	0	-----	0	33	3	13	0	4	0	36	68
Connecticut:											
Bridgeport	0	-----	0	0	0	40	0	0	0	0	29
Hartford	0	-----	0	18	1	3	0	3	0	3	-------
New Haven	0	-----	0	1	3	2	0	0	0	4	40
New York:											
Buffalo	0	-----	0	46	10	17	0	8	1	37	128
New York	40	9	4	623	64	154	0	84	5	62	1,251
Rochester	0	1	0	5	2	5	0	1	0	17	56
Syracuse	0	-----	0	43	4	4	0	0	1	33	51
New Jersey:											
Camden	3	2	1	9	2	0	0	1	0	2	28
Newark	0	-----	0	21	1	8	0	6	0	15	101
Trenton	0	-----	0	37	0	3	0	1	0	0	25
Pennsylvania:											
Philadelphia	3	1	1	36	12	75	0	23	4	38	391
Pittsburgh	2	1	1	225	16	38	0	10	0	49	146
Reading	0	-----	0	65	0	4	0	2	0	0	30
Scranton	0	-----	0	0	-------	8	0	-------	0	0	-------

[1] Figures for Grand Rapids, St. Joseph, and Tampa estimated; reports not received.

[2] Public Health Reports, Oct. 2, 1936, p 1392.

City reports for week ended June 19, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Ohio:											
Cincinnati	1	1	0	37	1	9	0	5	1	20	97
Cleveland	1	2	0	503	6	47	0	6	1	53	175
Columbus	0	------	0	17	2	3	0	0	0	17	98
Toledo	0	------	0	204	3	4	0	5	0	44	58
Indiana:											
Anderson	0	------	0	16	0	1	0	0	0	7	7
Fort Wayne	0	------	0	1	2	2	0	0	0	1	19
Indianapolis	0	------	0	156	4	3	1	1	1	19	78
Muncie	3	------	0	12	2	0	0	0	0	0	14
South Bend	0	------	0	0	1	1	1	0	0	0	16
Terre Haute	0	------	0	0	1	1	2	1	0	0	13
Illinois:											
Alton	0	------	0	0	0	0	0	0	0	0	9
Chicago	20	4	4	334	35	200	0	46	1	43	654
Elgin	0	------	0	0	0	1	0	0	0	2	8
Moline	0	------	0	1	0	0	3	0	0	7	5
Springfield	0	1	0	7	1	0	0	0	2	3	24
Michigan:											
Detroit	14	0	0	101	20	292	0	19	0	52	277
Flint	2	0	0	17	2	8	0	0	0	4	20
Grand Rapids	------	------	------	------	------	------	------	------	------	------	------
Wisconsin:											
Kenosha	0	------	0	0	0	3	0	0	1	0	6
Madison	0	------	0	0	0	1	0	0	0	10	13
Milwaukee	0	------	0	26	2	47	6	1	0	37	88
Racine	0	------	0	0	0	12	0	1	0	0	13
Superior	0	------	0	0	0	0	0	0	0	5	4
Minnesota:											
Duluth	0	------	0	0	1	15	0	2	0	0	15
Minneapolis	0	------	2	0	2	27	0	8	0	9	96
St. Paul	0	------	0	0	4	1	0	1	0	106	50
Iowa:											
Cedar Rapids	0	------	------	1	------	1	0	------	0	1	------
Davenport	0	------	------	0	------	0	0	------	0	0	------
Des Moines	0	------	------	0	------	14	0	------	0	0	20
Sioux City	1	------	------	0	------	5	1	------	0	2	------
Waterloo	0	------	------	2	------	4	0	------	0	3	------
Missouri:											
Kansas City	0	------	0	5	3	23	0	6	0	4	75
St. Joseph	------	------	------	------	------	------	------	------	------	------	------
St. Louis	6	------	0	37	6	46	1	5	0	29	187
North Dakota:											
Fargo	0	------	1	0	0	1	0	0	0	7	11
Grand Forks	0	------	------	0	------	0	0	------	0	10	------
Minot	0	------	0	0	0	0	1	0	0	0	6
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	0	------
Sioux Falls	0	------	0	0	0	0	0	0	0	0	8
Nebraska:											
Omaha	0	------	0	0	1	2	0	2	0	11	50
Kansas:											
Lawrence	0	------	0	3	0	0	0	0	0	5	3
Topeka	0	------	1	0	3	1	0	0	0	9	17
Wichita	0	------	0	8	1	2	0	1	0	14	19
Delaware:											
Wilmington	0	------	0	0	2	1	0	0	0	0	32
Maryland:											
Baltimore	0	------	0	79	13	8	0	13	1	67	208
Cumberland	0	------	0	0	0	2	0	0	0	2	11
Frederick	0	------	0	0	0	0	0	0	0	0	6
Dist. of Col.:											
Washington	3	------	0	93	4	7	0	12	0	23	137
Virginia:											
Lynchburg	1	------	0	6	0	0	0	0	0	4	12
Norfolk	0	------	0	0	5	0	0	1	1	1	29
Richmond	0	------	0	9	2	1	0	0	0	0	44
Roanoke	0	------	0	24	0	0	0	0	0	3	16
West Virginia:											
Charleston	0	------	0	1	2	1	0	0	0	0	6
Huntington	0	------	------	1	------	1	0	------	0	0	------
Wheeling	0	------	0	0	1	1	0	1	0	6	15
North Carolina:											
Gastonia	1	------	------	1	------	0	0	------	0	0	------
Raleigh	0	------	0	1	0	0	0	1	0	3	11
Wilmington	1	------	0	0	0	0	0	1	0	0	10
Winston-Salem	0	------	0	1	0	1	0	1	0	14	7

City reports for week ended June 19, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
South Carolina:											
Charleston	0	1	0	0	2	0	0	2	0	1	22
Florence	0		0	0	1	0	0	0	0	0	7
Greenville	0		0	0	0	0	0	0	0	0	7
Georgia:											
Atlanta	0	3	1	0	4	0	0	8	0	18	102
Brunswick	0		0	0	2	0	0	0	0	0	3
Savannah	1		0	0	3	0	0	2	1	5	29
Florida:											
Miami	0	2	0	0	3	0	0	6	1	0	36
Tampa											
Kentucky:											
Ashland	0		1	0	4	0	0	2	0	0	41
Covington	0		0	32	2	2	0	0	0	5	18
Lexington	0		0	0	2	0	0	2	0	10	22
Louisville	0		0	45	6	3	0	8	0	68	71
Tennessee:											
Knoxville	0		0	2	0	0	0	1	0	0	22
Memphis	0		0	59	2	0	0	6	0	16	77
Nashville	0		1	6	3	0	0	3	0	5	49
Alabama:											
Birmingham	1	3	0	16	3	1	0	0	2	4	60
Mobile	0		0	0	1	0	0	0	0	0	21
Montgomery	0			0		2	0		0	2	
Arkansas:											
Fort Smith	0			0		1	0		0	0	
Little Rock	0		0	0	3	0	0	2	0	0	5
Louisiana:											
Lake Charles	0		0	2	1	0	0	0	0	0	4
New Orleans	3		0	2	9	6	0	18	3	10	129
Shreveport	0		0	0	3	0	0	4	0	0	45
Oklahoma:											
Muskogee	1		0	2	0	0	0	0	0	0	
Oklahoma City	0		0	3	3	3	0	3	0	2	42
Tulsa	0			9		0	0		1	37	
Texas:											
Dallas	3		0	16	3	2	0	2	0	18	67
Fort Worth	0		0	3	0	2	0	3	0	2	30
Galveston	0		0	0	1	1	0	1	0	0	15
Houston	13		0	5	4	1	0	4	0	7	88
San Antonio	0		1	0	5	0	0	7	0	1	63
Montana:											
Billings	0		0	0	0	0	0	0	0	0	6
Great Falls	0		0	0	2	3	2	0	0	6	9
Helena	0		0	0	0	2	0	0	0	0	2
Missoula	0		0	0	0	0	5	0	0	0	5
Idaho:											
Boise	0		0	0	0	0	0	0	0	0	1
Colorado:											
Colorado Springs	0		0	0	1	6	0	0	0	0	14
Denver	3		0	36	3	9	0	5	1	24	73
Pueblo	0		0	0	0	0	0	0	0	0	7
New Mexico:											
Albuquerque	0		0	8	1	0	0	4	0	0	8
Utah:											
Salt Lake City	0		1	70	2	8	0	0	0	15	37
Washington:											
Seattle	1		0	13	4	2	0	4	0	30	77
Spokane	0		0	35	1	4	0	1	0	10	31
Tacoma	0		0	0	2	0	0	0	0	6	29
Oregon:											
Portland	0	1	0	2	4	6	0	2	0	1	84
Salem	0			0		2	0		0	1	
California:											
Los Angeles	9	7	0	14	19	32	0	16	3	93	318
Sacramento	2		0	22	1	2	0	2	2	20	23
San Francisco	5	1	0	10	6	12	0	6	0	48	161

City reports for week ended June 19, 1937—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases	State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				District of Columbia:			
Fall River	0	0	1	Washington	3	0	0
Worcester	1	0	0	Virginia:			
Rhode Island:				Richmond	0	0	1
Pawtucket	2	1	0	Kentucky:			
New York:				Ashland	0	1	0
New York	3	1	0	Louisville	1	0	0
Pennsylvania:				Tennessee:			
Philadelphia	2	1	0	Memphis	0	0	1
Pittsburgh	2	0	0	Alabama.			
Indiana.				Birmingham	1	0	0
Indianapolis	1	1	0	Texas:			
Illinois.				Dallas	0	1	0
Chicago	1	0	0	Houston	0	1	0
Elgin	0	0	1	California:			
Wisconsin:				Los Angeles	2	1	0
Milwaukee	1	0	0				

Encephalitis, epidemic or lethargic.—Cases New York, 2; Philadelphia, 1; Dallas, 1, San Francisco, 1.
Pellagra.—Cases: Baltimore, 1; Wilmington, N. C., 2; Charleston, S. C., 1, Savannah, 6; Los Angeles, 3.
Rabies in man.—Deaths: Lynchburg, 1
Typhus fever.—Cases. Savannah, 2 Deaths Savannah, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended June 5, 1937.—During the 2 weeks ended June 5, 1937, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	1				4					5
Chicken pox		6	16		603	50	133	16	125	949
Diphtheria			7		21	1	3	1		33
Erysipelas					3	7	2	4	5	21
Influenza	1				2	9			12	24
Lethargic encephalitis					1					1
Measles	10	170	8		1,626	274	150	181	192	2,611
Mumps		7	19		503	14	4	32	89	668
Paratyphoid fever								2		2
Pneumonia	13	1			12		6		4	36
Poliomyelitis					3	1				4
Scarlet fever	1	10	2		282	50	40	147	35	567
Smallpox								1		1
Tuberculosis	13	19	30		113	23	33	1	44	276
Typhoid fever			11		4	1	8		3	27
Undulant fever					7				1	8
Whooping cough		3	2		240	120	54	1	18	438

NOTE.—No report was received from Quebec for the 2 weeks ended June 5, 1937.

Vital statistics—Fourth quarter 1936.—The Bureau of Statistics of the Dominion of Canada has published the accompanying preliminary statistics for the fourth quarter of 1936. The rates are computed on an annual basis. There were 18.1 live births per 1,000 population during the fourth quarter of 1936 and 18.8 per 1,000 population for the same quarter of 1935. The death rate was 9.4 per 1,000 population for the fourth quarter of 1936 and 9.2 per 1,000 population for the fourth quarter of 1935. The infant mortality rate for the fourth quarter of 1936 was 75 per 1,000 live births and 66 per 1,000 live births in the corresponding quarter of 1935. The maternal death rate was 5.5 per 1,000 live births for the fourth quarter of 1936 and 4.5 per 1,000 live births for the same quarter of 1935.

The accompanying tables give the numbers of births, deaths, and marriages by Provinces for the fourth quarter of 1936, and deaths from certain causes in Canada for the fourth quarter of 1936 and the corresponding quarter of 1935.

Number of births, deaths, and marriages, fourth quarter 1936

Province	Live births	Deaths (exclusive of still-births)	Deaths under 1 year of age	Maternal deaths	Marriages
Canada [1]	50,261	26,226	3,765	274	22,854
Prince Edward Island	414	239	34	2	177
Nova Scotia	2,591	1,399	177	8	1,177
New Brunswick	2,416	1,209	194	16	1,038
Quebec	17,229	8,114	1,709	103	5,019
Ontario	14,333	9,211	902	80	7,391
Manitoba	2,951	1,407	182	18	1,923
Saskatchewan	4,383	1,559	258	26	2,657
Alberta	3,477	1,280	190	17	1,908
British Columbia	2,467	1,808	119	9	1,564

Cause of death	Canada [1] (fourth quarter)		Province, fourth quarter 1936			
	1935	1936	Prince Edward Island	Nova Scotia	New Brunswick	Quebec
Automobile accidents	394	405	2	21	13	106
Cancer	2,747	2,930	28	167	105	760
Diarrhea and enteritis	557	631	4	21	19	315
Diphtheria	111	97		4	1	64
Diseases of the arteries	2,216	2,241	19	149	102	425
Diseases of the heart	4,102	4,151	24	184	166	1,020
Homicides	31	24				4
Influenza	559	679	4	29	20	312
Measles	95	76		1		24
Nephritis	1,485	1,590	13	66	55	713
Pneumonia	1,852	1,989	22	102	100	624
Poliomyelitis	9	42				8
Puerperal causes	230	274	2	3	16	103
Scarlet fever	60	67		3	1	28
Smallpox	3					
Suicides	225	219		10	10	20
Tuberculosis	1,451	1,437	15	107	80	620
Typhoid fever and paratyphoid fever	79	56			4	23
Whooping cough	162	145	3	24	9	65
Other violent deaths	1,014	1,000	10	60	43	207

Cause of death	Province, fourth quarter 1936				
	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Automobile accidents	184	13	16	23	27
Cancer	1,126	195	169	126	248
Diarrhea and enteritis	157	35	42	22	10
Diphtheria	16	3	5	3	1
Diseases of the arteries	1,090	103	105	105	143
Diseases of the heart	1,813	210	225	189	320
Homicides	9	3	1	2	5
Influenza	173	29	36	45	31
Measles	9	4	19	8	11
Nephritis	488	64	66	40	85
Pneumonia	665	123	124	99	130
Poliomyelitis	9	12	5	2	6
Puerperal causes	80	18	26	17	9
Scarlet fever	12	2	7	13	1
Smallpox					
Suicides	101	12	19	13	34
Tuberculosis	253	96	57	84	125
Typhoid fever and paratyphoid fever	15	4	7	3	
Whooping cough	25	1	9	6	3
Other violent deaths	377	63	66	48	126

[1] Exclusive of Yukon and the Northwest Territories.

Vital statistics—Year 1936—Comparative.—Following are vital statistics for Canada for the year 1936 compared with 1935:

	1935	1936
Number of live births	221,451	219,464
Births per 1,000 population	20.3	19.9
Deaths	105,567	106,617
Deaths per 1,000 population	9.7	9.7
Deaths under 1 year of age	15,730	14,508
Deaths under 1 year per 1,000 live births	71	66
Maternal deaths	1,093	1,229
Maternal deaths per 1,000 live births	4.9	5.6
Deaths from—		
Automobile accidents	1,224	1,309
Cancer	11,156	11,652
Diarrhea and enteritis	2,767	2,374
Diphtheria	264	258
Diseases of the arteries	8,302	9,088
Diseases of the heart	16,069	16,361
Homicides	153	129
Influenza	3,392	3,096
Measles	490	372
Nephritis	6,176	6,390
Pneumonia	7,411	7,266
Poliomyelitis	64	99
Puerperal causes	1,093	1,229
Scarlet fever	212	244
Smallpox	4	2
Suicides	905	919
Tuberculosis	6,597	6,745
Typhoid fever and paratyphoid fever	273	256
Whooping cough	892	591
Other violent deaths	4,616	5,058

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for June 25, 1937, pages 858–871. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued July 30, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Ceylon—Central Province—Nuwara Eliya District.—On June 6, 1937, 1 fatal case of plague was reported in Nuwara Eliya District, Central Province, Ceylon.

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhua Sector.—Four rats found June 24, 1937, in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory, have been proved plague-infected.

Syria.—Under date of June 12, 1937, the American Consulate General at Baghdad, Iraq, reported that, owing to the occurrence of pneumonic plague in Syria, the frontiers of Iraq and Turkey bordering on Syria had been closed. It was stated that no cases had been reported either in Iraq or Turkey, and none in Syria since June 1, prior to which date 12 cases had been reported. The Director General of Health Services of Iraq stated that there was some doubt as to whether the diagnosis of plague was correct.

Typhus fever

Egypt.—During the week ended June 19, 1937, 1 case of typhus fever was reported in Port Said, and 1 case in Suez, Egypt.

Yellow fever

Dahomey—Bohicon.—On June 22, 1937, 1 suspected case of yellow fever was reported in Bohicon, Dahomey.

Gold Coast—Prestea.—On June 11, 1937, 1 fatal case of yellow fever was reported in Prestea, Gold Coast.

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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EXPERIMENTAL STUDIES OF NATURAL PURIFICATION IN POLLUTED WATERS

X. REOXYGENATION OF POLLUTED WATERS BY MICROSCOPIC ALGAE

By W. C. PURDY, *Special Expert, United States Public Health Service, Stream Pollution Investigations, Cincinnati, Ohio*

FOREWORD

Previous papers (*1, 2, 3, 4*) on the general subject "Experimental Studies of Natural Purification in Polluted Waters" have dealt successively with apparatus and technique, a suitable reproducible medium, extent of bacterial growth in different concentrations of medium, and, finally, the plankton as a factor concerned in the oxidation of organic matter.

Keeping in mind the general purpose stated in the initial paper, "to acquire more extensive and exact knowledge concerning the operation of natural agencies in the process of purification of sewage-polluted water", and confronted with the highly complex situation which invariably prevails in a natural stream (after prolonged and intensive study of the Potomac, the Ohio, and the Illinois Rivers), it has seemed necessary to conduct our laboratory studies under conditions of such control as would make possible a reasonable interpretation. The start was made by adding a single kind of bacteria, in pure culture, to the selected medium, and interpreting results as expressed by the dissolved oxygen history during a period of days. Then, a plankton organism—a bacteria-eating protozoan—was added and the experiments were repeated, with significant variations in the dissolved oxygen history of these cultures, as compared with the similar history of the cultures which contained bacteria only. This protozoan was in pure culture, and bacteria-free, hence resulting differences in the dissolved oxygen picture of the cultures could be ascribed to no other agency than the protozoan itself.

These experiments were repeated, but in none of the cultures were living plants introduced, a matter of difficulty because of the necessity of sufficient sunlight to enable the plants to function. Meantime, the matter seemed to be one of such importance that it could not be disregarded, inasmuch as a natural water body always contains not

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only bacteria and protozoa, but green plants also, of microscopic size or larger. Seeking information that would be serviceable in an understanding of the interrelations of the various factors usually found in natural streams, we were forced to the conclusion that the activities of minute plants had the same claim for attention as did the activities of bacteria and protozoa. Our work was incomplete without a study of aquatic plants and an attempted appraisal of their unique activity.

We used the same medium and the same bacterium in pure culture as were used in the previous experiments. However, instead of bacteria-eating protozoa, we used a pure culture of unicellular green alga, which, like all chlorophyll-bearing algae, gives off excess oxygen in the presence of sunlight. Thus there was projected into the picture as a factor the unique activity of green plants producing *in situ* a quantity of the very material, dissolved oxygen, by which the net efficiency of the several interrelated activities was to be measured. Atmospheric oxygen was meantime excluded from the cultures.

This paper presents the results of a series of controlled experiments carried out in an effort to learn whether certain minute chlorophyll-bearing plants common in natural water are able, if present in moderate number, to provide a measurable and significant quantity of oxygen, if exposed to such amounts of sunlight as normally occur from day to day and if unaided and unaffected by atmospheric aeration. We also attempt a tentative and approximate measure of the amount of such oxygen in comparison with the approximate volume of the plants which have produced it.[1]

RELATED STUDIES

In 1911 there was published an authoritative study (*5*) of dissolved gases in Wisconsin lakes, supported by basic data of unquestioned quality in convincing amount. Much emphasis was placed on the free CO_2, and also on the half-bound CO_2 contained in dissolved bicarbonates, the alkaline waters thus formed supporting the richest growth of algae, and consequently the heavier growth as well, of such microscopic animals as were dependent on the algal growths for food. During calm, clear weather, positive correlation was frequently indicated between abundance of algae and high content of dissolved oxygen. Apparently the only available explanation was the photosynthetic activity of the algae.

In 1912 Chambers' study (*6*) of the relation of algae to dissolved oxygen and carbon dioxide was published. Chambers summarizes, in part, as follows:

[1] It is desired to acknowledge the faithful and efficient cooperation, throughout these experiments, of Junior Bacteriologist Orena B. Stewart, who prepared the media, did practically all of the bacteriological work, and made the oxygen determinations. Also, the successful use of the finger-cot seal was due largely to Mrs. Stewart's skill.

"There is an intimate and mutual relation between the algae and submerged aquatics in a body of water and the gases dissolved in that water. They fluctuate together.

"Air or its constituents, oxygen and CO_2, are as essential to water plants as water is to land plants, and equally difficult to secure.

"The photosynthesis of rapidly-growing algae and aquatic plants in a body of water may diminish or deplete the supply of CO_2 and increase the oxygen content beyond saturation."

In 1913 the writer studied the extensive plant-filled shallow areas forming expansions of the Potomac River (*7*) and showed that the great masses of submerged plants function as oxygenators of the sewage-polluted water. That such increase in oxygen content was not due to atmospheric aeration incident to the spreading out of the water on the flat was repeatedly indicated when samples which had been exposed to plant activity on the flats during daylight averaged 91.5 percent saturation as compared with 82 percent saturation averaged by samples which had been on this same plant-filled flat during hours of darkness. Incidentally, it was emphasized that these samples collected in the afternoon showed a very different dissolved oxygen status of the water as compared with samples collected in the forenoon. The dissolved oxygen content of the water averaged 103 percent saturation on bright, sunny days, as compared with an average of 75 percent of saturation in samples collected at the same place on dark, cloudy days. The plants concerned were not only the larger, easily visible kinds (eel-grass, filamentous algae, and the like), but also innumerable microscopic forms, including diatoms.

Butterfield (*2*), seeking to develop a suitable synthetic medium with which to study the dissolved oxygen history of cultures of bacteria only, and again of bacteria and protozoa (both in pure culture) states that, in preliminary work, (1) bacteria increased rapidly in numbers, (2) to a rather definite limit, and (3) depletion of dissolved oxygen occurred meanwhile at the usual, well-defined rate. In further carefully checked cultures of *B. aerogenes* only, the bacterial content tended to remain constant after reaching their limiting numbers, and, at this point, oxygen depletion practically ceased; but in exactly similar cultures which, however, contained also the bacteria-eating protozoan *Colpidium*, (1) a rapid bacterial decline occurred, the bacteria apparently being consumed by the protozoa, (2) these greatly increased meantime, and (3) depletion of dissolved oxygen continued without interruption.

Mohlman and associates (*8*), studying data obtained from the sewage-polluted Illinois River at hourly intervals for a year, state that "in a highly polluted stream an hourly variation in concentration may occur similar to the well-known variation in concentration of sewage throughout the 24 hours. In the lower reaches of the same

stream, the same, if not greater, variation may be found in the dissolved oxygen content due to the presence of green and blue-green algae which give off large amounts of oxygen in the presence of sunlight."

In discussing the observed differences and variations, the authors point out the necessity of caution in accepting a single daily sample at a given station as representing the average conditions.

Rudolfs and Heukelekian in a study (*9*), whose purpose was the evaluating of the role of green organisms in the reaeration of the Delaware River, found rapid increase of dissolved oxygen during the morning hours, reaching maximum in the afternoon and declining thereafter and during the hours of darkness until a minimum was reached about the time of sunrise. The authors state that "in dealing with the pollution of a stream the role of reaeration by green organisms must be properly evaluated * * * because the temporary condition in the afternoon is by no means the daily average condition."

Birge and Juday (*11*), studying the penetration of light, found that in most transparent lakes 1 to 4 percent of the solar energy which was delivered at the surface penetrated to 18 meters, and a large growth of the moss *Drepanocladus* was found at this depth. In a highly-colored lake, however, light penetration was much less, being reduced to 0.5 percent at a depth of only 2 meters.

The writer, in a brief restudy of the Potomac River in 1932 (*12*), with a view to finding out whether the great areas of submerged plants were still as effective in producing oxygen as in 1914, found average percentages of saturation of dissolved oxygen as follows:

Station	Average percent saturation of dissolved oxygen	
	1914	1932
Water of river channel	71	51
Water of plant-filled flat	87	80
Water of plant-filled flat on cloudy days	75	81
Water of plant-filled flat on sunny days	103	108
Water ebbing to river channel after night hours on the plant-filled flat (morning samples)	82	59
The same after 4 to 6 daylight hours on the same flat (afternoon samples)	92	93

Inspection of the averages indicates the wide variation to be expected in dissolved oxygen content in a plant-affected environment, (1) on cloudy or on sunny days and (2) in samples showing plant effects during daylight hours as compared with night hours. Obviously, the hour of collecting samples is highly important when averages show a possible difference of from 10 to 34 percent in samples collected in the morning and the afternoon, respectively, as in the last two items in the tabulation.

In 1932, Olson (*13*), studying Minnesota lakes and taking samples 3 feet under the surface, found that late in the afternoon thé water showed 218 percent saturation, apparently due to photosynthetic oxygen produced by *Aphanizomenon*, but at 3 o'clock in the morning only 48 percent saturation was present. Meantime, samples taken at the same place, but 18 feet under the surface, showed only 38 percent saturation in the afternoon and the same at 3 a. m. Obviously the oxygen fluctuation due to plant activity was confined to the surface stratum of waters which light could penetrate, for at 18 feet "dissolved oxygen was as low after a long sunny day as it was after a dark, moonless night."

Olson studied a shallow lake which contained large amounts of macroscopic submerged vegetation. This lake was also polluted by sewage and creamery wastes. Desiring reliable data as to the net effect, on the lake water, of these two antagonistic agencies, the one supplying oxygen during hours of sunlight, the other using up dissolved oxygen all the time, day and night, Olson collected hourly samples for dissolved oxygen determination at four representative points in this lake, with results as follows:

TABLE O.—*Variation in dissolved oxygen during a 24-hour period* (Olson)

[Clearwater Lake, Waconia, Minn., July 22-23, 1932]

Time	Station A			Station B			Station C			Station D		
	D. O.	Temperature ° C	Percent saturation	D. O.	Temperature ° C.	Percent saturation	D. O.	Temperature ° C	Percent saturation	D. O	Temperature ° C	Percent saturation
10 a. m.	3.1	25	36.9	7	26	85.1	12.8	26	155.7	11.3	24	132.5
11 a. m.	3.9	26	47.4	10.5	26	127.7	13.8	26	167.9	11.3	24	132.5
12 noon	4.5	26	54.7	18.6	26	226.2	19.2	26	233.6	12.9	26	156.9
1 p. m.	5.2	26	63.2	10.1	26	122.9	20.3	26	246.9	14.0	26	170.3
2 p. m.	6.6	27	81.7	14.6	27	180.9	21.9	28	276.5	15.1	27	187.1
3 p. m.	5.1	29	65.6	15.1	28	190.6	23.3	28	294.1	15.1	28	190.6
4 p. m.	5.1	29	65.6	18.7	28	236.1	22.5	28	284.1	15.6	29	200.8
5 p. m.	9.3	29	119.7	11.1	28	140.1	23.8	28	300.8	16.3	28	205.8
6 p. m.	10.5	28	136.3	13.1	28	165.4	23.5	28	296.7	16.3	28	205.8
7 p. m.	10.3	28	130	14.2	28	179.3	23.3	28	294.2	15.7	27	194.5
8 p. m.	11.6	26	141.1	14.2	26	172.7	21.7	26	264	13.7	25	163.5
9 p. m.	11.1	26	135	12.2	26	148.4	20.3	26	246.9	14	26	170.3
10 p. m.	9.8	26	119.2	11.5	25	137.2	15.7	25	187.3	13.8	26	167.9
11 p. m.	9.2	25	109.8	9.8	25	116.9	12.4	25	147.9	12.8	25	152.7
12 midnight	11.3	25	134.8	8.0	25	95.4	8.6	25	102.6	11.9	25	142.0
1 a. m.	7.6	25	90.7	4.9	24	57.4	8.2	25	97.8	9.4	24	110.2
2 a. m.	6.5	25	77.5	5.5	24	64.5	7.8	24	91.4	10.7	25	127.7
3 a. m.	5.3	24	62.1	2.9	23	33.4	8.0	24	93.8	10.6	24	124.3
4 a. m.	4.6	24	53.9	3.7	24	43.4	6.9	23	79.5	10.0	24	117.2
5 a. m.	3.7	24	43.4	2.2	24	25.8	5.3	23	61.0	8.9	24	104.3
6 a. m.	2.1	24	24.6	3.0	24	35.1	5.7	23	65.6	12.3	24	144.2
7 a. m.	3	25	35.8	3.8	24	44.5	6.2	24	72.6	8.2	24	96.1
8 a. m.	2.7	26	32.8	3.6	24	42.2	8.2	24	96.1	9.2	25	109.8
9 a. m.	1.6	26	19.4	3.8	25	45.3	10.8	25	128.9	9.9	25	118.1

Location of stations:
Station A: Near the creamery sewer outlet.
Station B: 500 feet west of station A. (Submerged plants abundant.)
Station C: 500 feet northwest of station B. (Filamentous algae abundant.)
Station D: 500 feet northeast of station C. (No visible pollution. No visible plants.)

Thus the actual results obtained by these 24-hour samples indicate, in brief, that at station A, in the presence of heavy pollution from a creamery and of an abundant growth of submerged plants, the forces of aeration and of deaeration were apparently quite evenly matched, supersaturation reaching a low maximum of only 141.1 percent. Without plant-made oxygen stored during the day, night time might have shown a condition of near or actual depletion in this polluted area.

At station B, removed somewhat from heavy pollution but having, on the other hand, a thick bed of submerged plants, aeration was more than a match for deaeration, not only in frequency but also in magnitude, supersaturation reaching a high maximum of 236.1 percent.

At station C, still farther away from the creamery outfall, and in the presence of filamentous algae in large amounts, the dissolved oxygen content dropped below saturation only 8 times, and a maximum of 300.8 percent saturation was attained.

At station D, with neither visible plants nor polluting wastes near, the water showed only a single instance of less than saturation.

Calvert (*14*) studied the White River below the Indianapolis sewage plant outfall. The outstanding results of the study were as follows:

(1) Numerous samples collected in the morning, and again in the afternoon, showed the effects of plant activity in the consistently larger amounts of dissolved oxygen in the afternoon samples.

(2) Samples collected on a cloudy, rainy day showed less dissolved oxygen in the afternoon than in the forenoon, due apparently to decomposition without the compensating effect of photosynthesis, which requires sunlight.

(3) When the very high chloride content indicated an unusual amount of organic matter, neither morning nor afternoon samples showed dissolved oxygen. All were negative. Apparently the organic load was more than a match for the combined aerating effect from the atmosphere and from photosynthetic activity respectively.

Calvert further points out that dilution, time of day when samples are taken, and weather conditions may so affect the dissolved oxygen content that the indicated condition of the water is by no means the true or average condition.

Hubbs (*15*), discussing the many interrelated factors requiring consideration in any appraisal of the supposed damage (or benefit) done to fish life by sewage, points out that a badly polluted stream may show saturation, or even supersaturation, with dissolved oxygen (due to plant activity), especially if the samples be collected on sunny afternoons; but this same stream may, during the night and toward morning, show complete depletion of dissolved oxygen. It is thus shown that the oxygen content as indicated by the usual samples conveniently collected during the daytime does not give adequate information.

Schomer (*16*), investigating photosynthetic activity of certain water plants in Wisconsin lakes, found optimum conditions for photosynthesis varying (1) with weather conditions, sunny days being more effective than cloudy, (2) with depth as related to amount of sunlight available to the plants, and (3) with the kind of plant used. The greatest photosynthetic activity was found to be from 10:30 a. m. to 1:30 p. m.

THE PRESENT STUDY

GENERAL ITEMS OF SET-UP

In an attempt to simulate natural conditions so far as possible and yet maintain adequate laboratory control, the experiments were carried out as follows: (I) In sunlight, without motion of bottle contents; (II) in sunlight, with continuous motion of bottle contents; (III) in darkness, without motion; (IV) in sunlight, with motion of contents but in bottles stoppered with cotton plugs, thus affording contact with external air, and actual circulation of air. In all cases, bottles of 300-cc capacity, with ground-glass stoppers, were used; but in series IV these stoppers were replaced with cotton plugs.

In I, the sunlight, without motion experiment, the bottles were merely set upright on a shelf in a south window, in which position the cultures received direct sunlight, on a sunny day, for about 5 hours. There were usually 16 bottles in a set, with 2 or 3 extras, such as those on the shelf.

In II sunlight, with motion of bottle contents (causing continuous mixing), the 16 bottles were uniformly spaced and anchored in an inclined position within a horizontally rotating cage constructed of laths, which were spaced to admit sunlight to the culture. The cage, 1 foot by 1 foot by 3 feet, was placed horizontally on a shelf in a south window and rotated on its long axis about four times per minute.

In series III, without motion and without light, the bottles were placed in the 20° C. incubator. The outstanding factor in this case was the constant temperature.

In series IV the culture bottles were arranged on a pair of narrow hanging shelves, the weight of each shelf being counterbalanced by the weight of the other one. This contrivance, with its supporting framework, is referred to as the "elevator."

The bottles were placed in this elevator in pairs, one bottle on the front shelf, its companion bottle on the back, or second, shelf. Two bottles constituted one sample, the two being connected by an overhead siphon made in part of rubber tubing to provide flexibility. Into the two 300-cc bottles a total of 500 cc of medium was placed, thus leaving space within the bottles of a given pair for such medium as would be siphoned from one bottle to the other as the two shelves changed position in response to power applied periodically by a motor.

These shelves shifted once in 6 minutes. Every shift, changing the relative level of the two bottles of any given culture by about 2 inches, caused the transfer, by overhead siphon, of about 80 cc of the total 500 cc (16 percent) in the two bottles. Actual flow between the two bottles required a minute or less.

These pairs of bottles in the elevator were stoppered with cotton plugs through which the glass ends of the siphon were passed. In addition, a mat of sterilized cotton 1 inch thick, wide enough to envelop the entire bottle neck and to project about an inch or more above it, was wrapped around the bottle top and tied at top and bottom. External air gaining access to the bottle contents had to pass through this mass of sterilized cotton.

Cultures in the elevator were exposed in an east window and received direct sunlight in the morning only, until about 9 a. m., and diffused light and "sky-shine" the remainder of the day. This experiment was carried out in July.

Temperature.—In all the experiments carried out in the presence of sunlight, temperature was a factor incapable of control. Cultures motionless on the shelf exposed to direct sunlight would attain a temperature higher by two or three degrees than those cultures on the same shelf which were partly protected from direct light.

In the absence of temperature control, as in a window exposed (1) to direct sunlight daily for 5 or 6 hours, or (2) to cloudy conditions when these occur, or (3) to complete absence of sunlight during the night, there is inevitable fluctuation—especially the day and night fluctuations, which produce slight changes (expansion or contraction) of the bottle contents. Rise in temperature must necessarily force out, from a completely filled bottle, a small amount of the contained liquid. If this be water or similar liquid, it very soon evaporates, unless the external air with which it comes in contact be saturated, a very unusual condition.

Similarly, falling temperature, causing slight contraction of bottle contents, will produce a condition of partial vacuum within the bottle which must be relieved at the only point where this is possible, viz, about the periphery of the ground-glass stopper, the possible and probable result being a small body of air "sucked" into the bottle and forming a bubble at the lowermost end of the ground-glass stopper. It is also possible that a bubble may be formed within the bottle when, on rise of temperature, the dissolved gases already present must escape to some degree.

In dissolved oxygen determinations as usually performed in a laboratory, the danger of inaccuracy due to the presence of a bubble has been met (1) by an expanded bottle neck of such shape that a protective collar of water surrounds the stopper; (2) by inverting the bottles in a pan of water; (3) by storage in an incubator, thus eliminating tem-

perature fluctuations. In a series of experiments set forth in this paper, exposure to sunlight was necessary, and resulting fluctuations of temperature became a factor with which we were obliged to deal as best we might. Conditions of motion, as in the cage and the elevator, ruled out the use of a bottle with expanded neck and protecting water collar, and also prohibited recourse to the inverting of bottles in a pan of water.

In three experiments (numbers 1, 2, and 3) we had small bubbles of uncertain origin in many of the bottles Recognizing this condition as incompatible with desired accuracy of the results, we sought to correct, or to minimize, this possible hazard. These efforts resulted in the "finger-cot seal" device.

The finger-cot seal.—Finger cots of the largest size obtainable should be used. They must be fresh stock.

The mushroom-top glass stoppers, high form, are necessary in order that the finger-cot, when in position, may be sharply divided into two compartments, above and below this flat, circular mushroom-top, respectively. This portion of the glass stopper should be gone over previously with a file. The rim of the bottle neck must be free from nicks or rough places.

Bottles and their stoppers should be numbered so that stoppers do not become mixed. For sterilizing, cover the unstoppered bottle with a paper cap, tied loosely. Wrap each stopper in a small square of paper, folding or closing the edges of the paper above the flat mushroom-top. Mark, in the paper of the wrapped stopper, the number of the bottle to which this stopper belongs.

Open up the finger-cots so water will freely enter each one. Place all in a large beaker, two-thirds full of water, for sterilization in the autoclave, tying a paper cap over the beaker.

Have an assistant, wearing sterile rubber gloves, grasp, with thumb and forefinger of each hand, opposite sides of the open end of a sterilized cot, lifting it, nearly filled with the sterile water, from the beaker, and *holding it firmly*.

With the right hand grasp the wrapped stopper, and, holding it by the lowermost end (which is still wrapped in paper), with left hand separate widely the folds over the mushroom top, so as to expose this top, but without touching the glass with the fingers.

With the right hand crowd this exposed glass top down into the sterile finger cot, which the assistant holds firmly meantime and stretches the open end from side to side in order to admit the flat circular top of the glass stopper. This top should now be crowded down at least an inch into the finger cot. Now remove the right hand from the stopper, bringing away meantime the paper wrapping.

Quickly remove the paper cap from the top of the filled bottle which is about to receive the stopper, and steady the bottle firmly while the assistant, retaining with both hands his original thumb-and-finger hold on the cot (now containing the inverted stopper), inserts the stopper into the bottle and with the same movement "snaps" the rubber finger cot down around the neck of the bottle.

We now have the filled culture bottle with the stopper inserted, without bubble, and without having been touched except by sterile gloves. The sterile finger cot, superimposed over the stopper and pulled down around the bottle neck, shows two compartments: (1) a nipple-like projection above the top of the stopper, and (2) an enclosed space, roughly spool-shaped, between the under surface of the stopper top and the uppermost part of the bottle neck. The vertical dimension

of this enclosed space is about one-half inch. Compartment 1 contains water and this water is sterile; compartment 2 contains chiefly air.

Press the stopper firmly into place if necessary. Then with dry finger and thumb pinch and take hold of the rubber at a point on the edge of the mushroom top and gently but firmly pull the rubber away from contact with this edge, making a passageway between compartments 1 and 2. Meantime tip the bottle slightly in the opposite direction. The air in compartment 2 will now pass up into compartment 1, displacing the water, which will meantime flow down into compartment 2, completely filling this space and forming a collar of sterile water enclosing the periphery of the ground-glass stopper.

The walls of this finger-cot seal are elastic, and the culture bottle equipped with it may be turned over and over (as in the rotating cage) without lessening the effectiveness of the seal. This seal will prevent access of outside air to the bottle contents, and if, with fluctuating temperatures, a concentration of bottle contents tends to replace a partial vacuum thereby created, the only available material for this replacement is the sterile water held in place by elastic walls and surrounding the stopper at the point where this enters the neck of the bottle. No known device will absolutely prevent the escape of excess oxygen (or other gas) from the bottle.

THE CULTURES

Contents of culture bottles.—Three classes of cultures were used, as follows: (1) Bacteria only; (2) bacteria and alga; (3) alga only. In the first three experiments, the alga-only cultures were omitted.

The alga used was a bacteria-free culture of *Oöcystis*, isolated by dilutions of polluted river water plated in dilute agar and the resulting isolated colonies picked and thus transferred to broth.

Oöcystis is thus described by Needham and Lloyd (*17*): "The ellipsoidal cells exist singly or a few are loosely associated together in a clump of mucus. The cells possess a firm smooth wall which commonly shows a nodular thickening at each pole."

In the more recent text by Smith (*18*), further details are mentioned: "The cells are broadly to narrowly ellipsoidal * * * and with rounded to somewhat pointed poles. The cell wall is thin and without spines or other ornamentation except for a small nodular thickening at each pole * * *. Sixteen species have been recorded as occurring in the United States."

I believe the species used in our experiments to be *Oöcystis lacustris*. The poles are somewhat pointed, and the cells are 7 to 10 or more microns long.

The bacteria used was a suspension of *Bacterium aerogenes* in pure culture.

The medium was double strength "synthetic sewage" devised by Butterfield (1929), (*2*, *3*). This is—

Distilled water, buffered at pH 7.2 with phosphate salts in concentration of 2.5 grams per liter. Dextrose-peptone-phosphate broth, per liter 2 cc.

The above represents a concentration of 10 milligrams of dextrose and of peptone per liter.

This stronger medium was selected in consideration of the interrelated facts that limited capacity of the cage (16 bottles) enabled us to examine only 5 sets (of 3 bottles each) after the initial examination. These examinations were so spaced that the total interval covered was from 10 to 17 days. In order to obtain sufficient response from the slow-growing plants, as well as from the rapidly growing bacteria, not only this interval of time, but also the stronger medium, was considered necessary.

This medium was sterilized in two or three carboys. When entirely cooled, a suspension of *B. aerogenes* was added to two carboys; to one of these two was added a suspension of the alga *Oöcystis* in measured amount. To a third carboy was added only the alga suspension. Since this alga was growing in broth (which would add materially to the available dissolved organic matter in the carboy), a like amount of the alga suspension, after being killed by heat, was added to the carboy containing bacteria only. This was done in order to equalize the available food in the two carboys containing bacteria. All carboys were vigorously shaken for several minutes to mix and aerate the contents and to bring all cultures to the same basis at the start. After carboys had stood quiet for 30 minutes, the contents were siphoned, with aseptic precautions throughout, into the numbered 300-cc bottles, which were then placed in their respective positions in the cage, the incubator, the elevator, or on the shelf. Initial examinations were made for the content of bacteria, of alga, and of dissolved oxygen. The pH was uniformly 7.1, and remained at or very near this point throughout the experiment.

A "log" was kept of each experiment, particularly of weather conditions and the approximate number of hours of sunshine, of "skyshine", and abundance and kind of clouds, including partial or total "overcast." The uncertain sequence of dark days and sunny days is one of the major conditions affecting plant life in nature, and the plant-work done under such natural weather conditions is a reasonable measure of what we may expect in the average watercourse.

We have insufficient data relative to large volumes of smoke from railroad yards about 150 yards to the south of the southern-exposure window housing our cultures. This smoke was the more effective on still days. Wind became a factor by quickly scattering the smoke-pall on certain days. Lack of adequate data relating to these local clouds obviously decreases the reliability of our weather record.

The light concerned in the following experiments passed through panes of ordinary window glass and also through the cylindrical wall of flint glass constituting the culture bottle before reaching the contained organisms. No attempt was made to measure the limitations thus imposed, as compared with the natural, unobstructed light avail-

able to plants in a natural water body. All examinations were made about 1 p. m.

In all cases the bacterial counts were made from agar plates after 24 hours' incubation at 37° C. The dissolved oxygen determinations were made by the usual Winkler method. The counts of alga cells were made by the use of a Sedgwick-Rafter counting cell. The alga cells were of such size that about 50 were required to make up a volume equal to one cubic standard unit (a cube with an edge of 20 microns). This count of alga cells was, therefore, simply the actual number of cells present divided by 50, and further expressed in parts per million *by volume* by dividing the number of cubic standard units by 125 (*19*).

Experiments 1 to 4, inclusive, were carried out in 1931, and experiment 5 was carried out in July 1932.

THE INDIVIDUAL EXPERIMENTS

Experiment No. 1.—January 27 to February 6, 1931.

Cultures were of two kinds, viz, *B. aerogenes* only, and *B. aerogenes* plus the alga *Oöcystis*. Both cultures were exposed to light, without motion, and duplicates were exposed to sunlight, with motion meantime. The pH remained at about 7.1 throughout. In the 10.5 days' duration of the experiment, there were 12 sunny half-days and 9 cloudy half-days. The hours of daylight, both cloudy and sunny, made up about 33 percent of the total time, and the sunny hours alone formed 19 percent of the total of 252 hours. Data are recorded in tables 1 and 2.

TABLE 1.—*History of dissolved oxygen in bacterial cultures with and without alga, with no atmospheric aeration meantime. In sunlight, and without motion*

Days	Temperature °C.	Bacteria only		Bacteria and alga		
		Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	23	7.4	7.71	6.6	7.80	1.28
1	23.5	163	7.95	610	6.20	1.44
2	22.5	3,740	5.32	2,790	5.52	2.24
3	25.5	3,070	5.25	3,770	6.00	2.24
4	23	3,690	5.34	4,700	6.66	5.40
6	23.5	3,650	6.00	2,660	8.00	17.70
8	29.5	2,600	6.08	1,280	12.02	37.10
10	----------	430	5.58	1,080	12.34	54.70

Table 2.—*History of dissolved oxygen in bacterial cultures with and without alga, with no atmospheric aeration meantime. In sunlight, and with continuous motion*

Days	Temperature °C.	Bacteria only		Bacteria and alga		
		Bacteria in 1 cc (in thousands)	D. O., p.p.m.	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	23	7.4	7.71	6.6	7 80	1.28
1	23	301	6 50	112	7 35	2.40
2	23	6,100	4.85	2,430	5.05	1.60
3	27	3,920	5 20	3,370	5 42	2.88
4	24.5	3,900	4.60	5,700	5 38	4.25
6	23 5	3,290	4.53	2,490	8 30	10.80
8	29.5	3,280	5.70	1,640	9.12	35.80
10	----- ---	1,960	5.24	1,420	11 34	69.80

Particular attention is invited to the great increase in alga content (column 7), and also to the increase in dissolved oxygen content meantime (column 6), notwithstanding the consumption of some oxygen by the growth of bacteria. Inasmuch as the bacterial content and growth are approximately the same as in the bacteria-only culture run at the same time and under the same conditions (columns 3 and 5), we may reasonably assume that the dissolved oxygen required by bacterial growth in each case is about equal, or approximately 2.13 parts.

The significant feature in the behavior of the bacteria-only cultures lies in the fact that oxygen is consumed but is not replaced. The equally significant fact shown by the bacteria-plus-alga cultures is *the replacement of oxygen.* In this particular experiment the proportion of sunshine (19 percent) has made possible such plant increase during 10 days that the oxygen thereby produced meantime far more than equals the amount used by the bacterial content, which, at the maximum, numbers nearly 5 million per cc. Less sunshine would logically mean less plant growth and less oxygen.

The dissolved oxygen record in table 2 is very similar to that given in table 1. Decrease in content is correlated with initial increase in bacterial numbers, and there is no marked and sustained tendency thereafter for this lessened oxygen content to recover by replacement of the consumed oxygen.

Again we note, as in table 1, that the outstanding difference between the bacteria-only cultures and the bacteria-plus-alga cultures lies in the ability in the latter to *replace the oxygen used by bacterial growth.* Thus far this replacement efficiency has been more than a match for the consumption factor. This fact is indicated by the presence, after 10 days, of greater amounts of dissolved oxygen than were present at the start.

Summary.—1. The addition of motion (continuous mixing of the bottle contents) apparently makes no great difference in bacteria,

alga, or dissolved oxygen content. However, the growth of both bacteria and alga is somewhat the greater during the last 4 days, in those cultures having motion.

2. Consumption of dissolved oxygen is correlated, both as to time and magnitude, with the increase in bacterial growth, in both the bacteria-only experiments.

3. In the similar bacterial history of each of the experiments where the cultures contained both bacteria and alga, the dissolved oxygen shows a drop from the initial, then gradual, but very marked recovery and further increase *above* the initial content.

4. Growth of the alga in these same cultures, in both experiments, showed a heavy increase over the initial content, especially during the final 4 days, when the dissolved oxygen also showed increase above the initial content.

Experiment no. 2.—February 9 to February 20, 1931, inclusive.

During the 11 days of the experiment, daily weather observations showed a preponderance of cloudy days, there being 15¼ cloudy half-days (62 hours) and 6¼ sunny half-days (26 hours), as compared with the 9 cloudy half-days and 12 sunny half-days of experiment no. 1. This is on the basis of 8 hours of effective sunlight each day. On this same basis there are 16 hours of essential darkness each day, or a total of 176 hours of the total 264 hours' duration of the experiment. Thus during 65 percent of the time there was no possibility of any photosynthesis. During the remaining 35 percent of the time, a large percentage of dark and cloudy days reduced the time during which active photosynthesis was possible to 26 hours, which is only 10 percent of the total duration of the experiment. On a basis of effective photosynthesis hours, in the previous study (experiment no. 1) there were almost twice as many light hours as were available to experiment no. 2.

Results of experiment no. 2 are recorded in tables 3, 4, and 5.

TABLE 3.—*History of dissolved oxygen in bacterial cultures with and without alga, with no atmospheric aeration meantime. In sunlight, and without motion*

Days	Temperature °C	Bacteria only		Bacteria and alga		
		Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	20.5	8.6	8.45	8.5	8.30	2.56
1	18.5	410	7.90	43	8.30	3.84
2	20.5	5,900	6.38	8,050	5.72	4.32
3	19.5	8,650	5.54	8,800	5.82	4.32
4	19	6,600	5.78	7,350	6.22	5.45
5	20	6,700	5.78	6,800	6.12	5.45
7	19	5,000	5.68	1,680	6.62	8.00
9	20	690	5.60	2,750	7.08	9.60
11	21	3,590	6.68	3,700	8.02	13.76

TABLE 4.—*History of dissolved oxygen in bacterial cultures with and without alga, with no atmospheric aeration meantime. In sunlight, and with continuous motion*

Days	Temperature ° C.	Bacteria only		Bacteria and alga		
		Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	20.5	8.6	8.45	8.5	8.30	2.56
1	20.5	2,270	6.50	272	7.98	4.31
2	21.5	7,900	5.96	8,300	5.72	3.20
3	19.5	7,500	5.38	8,700	5.36	3.52
4	20.5	8,200	5.22	7,600	5.50	4.47
5	19.5	8,350	5.18	9,300	5.38	5.60
7	20	7,350	5.50	9,050	6.32	8.95
9 [1]						
11	19.5	6,600	5.02	6,750	6.20	12.64

[1] No sample.

TABLE 5.—*History of dissolved oxygen in bacterial cultures with and without alga, with no atmospheric aeration meantime. In darkness, and without motion, in the 20° C. incubator*

Days	Temperature ° C.	Bacteria only		Bacteria and alga		
		Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	20.5	8.6	8.45	8.5	8.30	2.56
1	20	770	7.70	620	7.80	3.52
2	21	8,300	5.87	8,750	5.64	4.16
3	21	9,450	5.52	8,800	5.58	3.52
4	21.5	8,950	5.50	9,100	5.40	2.40
5	20.5	8,150	5.54	9,400	5.42	3.20
7	20	8,350	5.62	8,200	5.40	3.68
9	22.5	8,100	5.37	7,600	5.40	2.72
11	22	8,350	5.38	7,000	5.20	2.40

The general set-up of experiment no. 2 (as to organisms, medium, and containers) was the same as in experiment no. 1. The procedure followed was also the same, but an added feature was the placing of a set of cultures in the 20° C. incubator. (See table 5.)

In the bacteria-only culture, in darkness and without motion, in the 20° C. incubator (see table 5), essentially the same course of events takes place as in the preceding bacteria-only cultures, table 3, in the light. Bacterial maximum is reached the third day, after which a very slight decrease takes place, but bacterial content remains at a relatively high point until the close. The dissolved oxygen content is similarly stabilized after the first drop (in 48 hours) from the initial content caused by the bacteria increasing to maximum.

The bacteria-plus-alga portion of table 5 is worthy of study. The bacterial history of these cultures stored in darkness in the 20° C. incubator is in all respects a practical repetition of that in the com-

panion cultures in sunlight and containing bacteria only. The dissolved oxygen history of the two set-ups in table 5 (bacteria only, and bacteria-plus-alga) is likewise an item for item proposition. The algal history meantime, after a temporary and very slight increase over the initial content of 2.56 p. p. m., shows a somewhat erratic course to a final value of 2.40 p. p. m., which is slightly *less* than the initial content of 11 days previous. This is radically different from the algal histories of any of the four preceding set-ups, in all of which a progressive increase and heavy final algal content is to be found.

Summary.—1. There is no essential difference in algal growth or in dissolved oxygen history in the recorded results in tables 3, 4, and 5 to indicate any marked advantage resulting from continuous mixing.

2. Decrease in dissolved oxygen is correlated, in time and substantially in magnitude, with the increase in bacterial content in all three of the bacteria-only experiments, regardless of motion and of light.

3. In the companion cultures (containing both bacteria and alga) of the two set-ups exposed to light, tables 3 and 4, the dissolved oxygen shows a drop from the initial content at the time of greatest bacterial increase, practically paralleling, in time and magnitude, the similar event in the bacteria-only cultures. These bacteria-and-alga cultures then show a slow, but well-marked, *increase* of dissolved oxygen, failing, however, to regain the initial content. In the similar culture exposed to darkness (table 5) the drop of dissolved oxygen from the initial content is indicated, but the later increase and attempted recovery is absent.

4. Growth of alga in the two set-ups exposed to light shows a progressive increase over the initial content. In the similar culture exposed to darkness, a very slight and temporary increase is noted (see table 5), with subsequent decrease to a point slightly less than the initial content.

5. Algal cells in cultures stored in darkness showed scant growth and failed to produce oxygen. The same alga during 10 percent of sunshine hours in experiment no. 2 showed moderate increase (400 percent) and produced nearly enough oxygen to replace that consumed by bacterial growth; but in experiment no.1, with 19 percent sunshine hours, algal growth was heavy (4,000 to 5,000 percent), and the oxygen thus produced was far more than enough to replace the amount consumed.

6. There is noticeable smoothness in the curves of increase or of decrease indicated by the data in table 5, in bacteria and in dissolved oxygen (see columns 3, 4, 5, and 6), a logical result of stable temperatures and absence of sunlight. The values in the alga content (column 7), are erratic in comparison.

Experiment no. 3.—February 24 to March 6, 1931, inclusive.

During the 10 days of the experiment there were 10 half-days (40 hours) of sunshine and 10 half-days (40 hours) of cloudy and smoky daylight, during which latter period photosynthesis must necessarily have been greatly limited. The 40 hours of effective light (sunshine) constituted 18½ percent of the total 240 hours' duration of the experiment.

The medium in experiment no. 2 (preceding) was slightly cloudy, owing to precipitation at the time of autoclaving. The medium in experiment no. 3 was clear. The pH determined at start, midway, and at the close of the 10-day experiment was 7.3 for all three of the bacteria-only set-ups, and 7.1 for all three of the companion set-ups, which contained both bacteria and alga.

Results of experiment no. 3 are recorded in tables 6, 7, and 8.

All three of the bacteria-only cultures followed the same general course as that in the preceding two experiments as to bacterial content and dissolved oxygen consumption. There was no well-marked replacement of oxygen.

TABLE 6.—*History of dissolved oxygen in bacterial cultures with and without alga, with no atmospheric aeration meantime, in sunlight, and without motion*

Days	Temperature °C	Bacteria only		Bacteria and alga		
		Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	20 5	16 6	8 86	16. 6	8. 92	2 24
1	26	4, 500	6. 84	4, 100	6. 70	2. 62
2	26	6, 100	6 18	8, 200	7 04	4. 10
3	25	7, 300	6 30	6, 900	8 78	11 70
4	22 5	4, 800	6 84	160	9. 92	39 20
6	18	6, 000	7. 04	7, 000	11 88	49. 40
8	19	700	7. 00	2, 240	12. 80	72 00
10	18 5	510	7. 72	940	11. 44	72. 60

TABLE 7.—*History of dissolved oxygen in bacterial cultures with and without alga, with no atmospheric aeration meantime, in sunlight, and with continuous motion*

Days	Temperature °C.	Bacteria only		Bacteria and alga		
		Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	20. 5	16. 6	8. 86	16	8. 92	2 24
1	26	5, 040	6. 30	4, 910	6. 52	2. 84
2	26 5	7, 550	5. 94	7, 150	7. 27	4. 7
3	26	7, 300	5. 64	9, 100	7. 36	10. 3
4	23	8, 600	6 08	6, 100	8. 46	24
6	19. 5	3, 730	5. 50	5, 200	9. 78	35
8	21	4, 800	6. 18	1, 980	12 20	75. 7
10	20. 5	2, 890	6. 30	1, 090	12. 08	67. 7

TABLE 8.—*History of dissolved oxygen in bacterial cultures with and without alga, with no atmospheric aeration meantime, in darkness, and without motion, in the 20° C. incubator*

Days	Temperature °C.	Bacteria only		Bacteria and alga		
		Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	20.5	16.6	8.86	16	8.92	2.24
1	21.5	4,360	6.74	4,800	6.62	2.75
2	22.5	7,000	6.38	9,400	6.40	2.55
3	22.5	8,800	6.28	8,550	6.32	2.24
4	23	9,150	6.80	9,400	6.28	2.68
6	20	7,450	5.96	7,900	6.10	2.14
8	22	8,900	6.14	8,600	6.68	2.14
10	21.5	6,800	6.08	7,500	5.94	1.66

The two cultures containing both bacteria and alga cells, and exposed to light meantime, show bacterial content very similar to that in the bacteria-only cultures, but the dissolved oxygen history (column 6, tables 6 and 7) shows a marked replacement of oxygen, the final amount greatly exceeding the initial content in both cases. Meantime the alga cells have increased by about 3,000 percent. The bacteria-and-alga cultures in darkness show the usual bacterial history (see table 8). The dissolved oxygen history shows the usual drop from the initial content, but does not recover. It is apparent that the alga cells have not functioned, for there is neither increase of these cells nor replacement of dissolved oxygen.

Experiment no. 4.—In this experiment the culture bottles were provided with the individual seal of sterile water held about the stopper and neck of the bottle by a superimposed finger cot, as previously explained. We also added a third group of bottles containing the same medium as the others and subject to the same technique in all respects, but inoculated with alga cells only.

During the period April 6 to 23, inclusive, there were 25½ half-days of sunshine and 8½ half-days of cloudy weather. Regarding 8 a. m. as the hour at which sunlight is sufficiently effective for plant activity, and 4 p. m. as the approximate time of the end of such activity, the 17 days' duration may be stated as a total of 408 hours, of which 25½ half-days of sunshine (of 4 hours each) give a total of 102 hours. Thus, the approximate amount of effective sunlight comprised 25 percent of the total 408 hours.

The results of experiment no. 4 are recorded in tables 9, 10, and 11.

TABLE 9.—*History of dissolved oxygen in cultures of bacteria only, of bacteria and alga, and of alga only, with no atmospheric aeration meantime. In sunlight, and without motion*

Days	Temperature, °C.	Bacteria only		Bacteria and alga			Alga only		Remarks
		Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0	22	18.9	8.52	22.6	8.50	4.4	8.40	5.4	[a] Contaminated.
1	22.5	6,030	4.48	6,140	4.96	10.3	8.76	14.1	
2	22.5	10,800	3.48	10,400	4.22	10.4	[a] 7.70	[a] 17.2	
3	30	11,000	3.22	11,000	5.08	24.2	[a] 6.94	[a] 48.0	
4	23	11,100	2.22	11,400	4.50	30.6	12.76	87.0	
5	26	12,000	2.52	14,000	4.80	44.5	12.90	90.8	
7	27.5	8,550	1.82	6,550	4.48	44.6	[a] 13.20	[a] 137.6	
9	29	4,400	0.42	3,370	5.12	56.9	13.20	125.4	
11	22.5	6,700	(1)	5,300	4.63	19.7	12.90	111.4	
14	30.5	1,020	(1)	1,390	6.34	26.6	13.36	117.3	

[1] Depleted.

TABLE 10.—*History of dissolved oxygen in cultures of bacteria only, of bacteria and alga, and of alga only, with no atmospheric aeration meantime. In sunlight, and with continuous motion*

Days	Temperature, °C.	Bacteria only		Bacteria and alga			Alga only		Remarks
		Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0	22	18.9	8.52	22.6	8.50	4.4	8.40	5.4	[a] Light bacterial contamination at time of examination.
1	27	8,010	4.18	6,370	4.38	12.2	8.52	9.1	
2	25	12,500	2.90	12,500	4.00	12.1	9.02	16.5	
3	28.5	10,900	2.84	11,600	4.48	23.8	12.38	61.2	
4	24	10,600	2.50	11,000	[1] 2.18	17.7	11.58	[a] 99.3	
5	24	15,400	2.28	12,000	5.04	19.6	12.60	96.6	
7	26	11,200	1.98	11,000	5.10	34.5	12.66	[a] 145.2	
9	26.5	9,600	1.36	9,500	5.58	34.2	12.18	143.5	
11	23.5	9,200	0.04	9,100	5.92	24.7	13.03	112.5	
14	29	6,100	0.38	2,220	8.00	27.3	12.18	131.2	
17	24	5,200	(2)	2,630	7.54	26.0	14.56	126.0	

[1] There is no apparent explanation for this low value in D. O. [2] Depleted.

TABLE 11.—*History of dissolved oxygen in cultures of bacteria only, of bacteria and alga, and of alga only, with no atmospheric aeration meantime. In darkness, and without motion, in the 20° C. incubator*

Days	Temperature, °C.	Bacteria only		Bacteria and alga			Alga only		Remarks
		Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0	22	18.9	8.52	22.6	8.50	4.4	8.40	5.4	Available samples were too few to permit examination each day, hence initial, 4th, 11th, and 17th days'. Samples were selected as representative. [a] Contaminated with bacteria.
1	22.5	7,230	4.32						
2	22	13,000	3.48						
3	24	10,400	3.18						
4	23.5	12,500	3.16	11,300	8.08	9.2	7.38	26.5	
5	23	12,000	3.10						
7	19	15,000	2.90						
9	22	11,100	2.72						
11	22	11,800	2.70	9,750	2.60	15.7	[a] 1.88	[a] 33.1	
14	24	9,000	2.58						
17	21.5	8,050	2.38	8,850	2.04	8.5	4.98	41.4	

In the bacteria-only cultures in darkness (table 11) bacterial growth is of about the same magnitude as in the similar cultures exposed to light, but the amount of oxygen used meantime is somewhat less—only 6.14 parts—and the initial content of 8.52 parts is, therefore, sufficient to save these cultures from the fate of oxygen depletion experienced by the similar cultures exposed to light. This difference in amount of oxygen consumed may be due in part to the fairly stable temperatures (column 2) in the incubator as compared with the widely varying day temperatures of light-exposed cultures in tables 9 and 10.

Summary.—1. Cultures containing bacteria only are found to deplete, wholly or in large part, the initial content of dissolved oxygen.

2. Cultures containing both bacteria and alga show similar heavy decrease of initial dissolved oxygen, but in the presence of sunlight later regain nearly all of it because of the output of plant-made oxygen by the increase of 2,000 percent in algal content.

3. Bacteria-only cultures in darkness (in the 20° C. incubator) show a bacterial content similar in day-by-day magnitude to the cultures exposed to light, but the dissolved oxygen is not exhausted, though heavily reduced.

4. Bacteria-and-alga cultures in darkness show a bacterial history very similar in all respects, and the dissolved oxygen is similarly reduced, but without any tendency toward final recovery, the alga meantime increasing only a very little. The alga-only cultures show an essentially similar oxygen history.

Experiment no. 5.—The objects were as follows:

1. To repeat the work done in experiments 1, 2, 3, and 4, and thus to obtain additional data relative to the ability of a unicellular alga in pure culture to provide, by photosynthesis, sufficient dissolved oxygen to meet the requirements of aerobic bacteria increasing to moderately high numbers in a medium simulating a diluted sewage, atmospheric aeration being cut off meantime.

2. Using as a background the accumulated roughly quantitative data as to the positive performance of the alga in providing oxygen without recourse to atmospheric aeration, to present, for comparison, the bacterial history, the alga history, and especially the dissolved oxygen history of exactly similar cultures, run at the same time, but differing in the one particular that these similar cultures were exposed to continuous atmospheric aeration, but under aseptic conditions. The bottles in this portion of Experiment 5 were placed in the arrangement of balanced movable hanging shelves already described as the "elevator." Other cultures were placed, as usual, in the rotating cage, where they had both motion and sunlight, and on the stationary shelf, where they had sunlight but no motion. No cultures were run in the 20° incubator in this experiment.

During July 12–26, 1932, there were 24 sunny half days and 4 cloudy (light overcast) half-days, or 120 hours of effective light and 20 hours of noneffective (or less effective) light, owing to partial overcast of clouds. This is on the basis of the hours 7 a. m. to 5 p. m. being regarded as effective light. In terms of percent, 86 percent of the daylight was effective as compared with 14 percent noneffective. In terms of the total of 336 hours of this 14-day experiment, effective sunlight made up almost 36 percent of this total. No definite record was kept of local smoke clouds, or of winds which, if present, quickly dispersed such clouds.

Tables 12, 13, and 14 record the results, the first two giving the data of the sealed c ltures, with atmospheric aeration excluded, and table 14 giving results from exactly similar cultures which were exposed, during the entire time of the experiment, to atmospheric aeration and to mixing of bottle contents.

TABLE 12.—*History of dissolved oxygen in cultures of bacteria only, of bacteria and alga, and of alga only, with no atmospheric aeration meantime. In sunlight and without motion*

Days	Temperature, °C	Bacteria only		Bacteria and alga			Alga only		Remarks
		Bacteria in 1 cc (in thousands)	D. O., p. p. m	Bacteria in 1 cc (in thousands)	D. O., p. p. m	Alga in 1 cc (in p. p. m. by volume)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0	22 5	34 3	7.1	34.6	7.0	4 2	7.1	2 9	
1	30	6,600	3.6	5,500	3.6	7 3	7 02	8 2	
2	34	9,800	2.5	9,050	2 58	10	8 40	16.5	
3	36	8,500	2 0	6,500	3 18	12 7	9.00	17.4	
4	36	6,300	0.9	750	2 32	10.2	10 90	30.5	
6	35.5	364	0.9	375	3 22	13	[a] 6 82	16.7	[a] Cause of low D. O. unknown
8	36	28 6	0 7	20	5 12	12 6	10 56	36 1	
11	35 5	----------	1.1	73 5	7 08	15	[b] 2 4	[b] 20 2	[b] Contaminated.
14	28	77.5	1	106	6 90	36 8	10.22	63	

TABLE 13.—*History of dissolved oxygen in cultures of bacteria only, of bacteria and alga, and of alga only, with no atmospheric aeration meantime. In sunlight, and with continuous motion*

Days	Temperature, °C.	Bacteria only		Bacteria and alga			Alga only		Remarks
		Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Bacteria in 1 cc (in thousands)	D. O., p. p. m	Alga in 1 cc (in p. p. m. by volume)	D. O., p. p. m	Alga in 1 cc (in p. p. m by volume)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0	22.5	34.3	7.1	34.6	7.0	4.2	7.1	2.9	[a] Contaminated.
1	30	5,650	3.6	6,200	3 8	9 4	[a] 7.1	[a] 7.3	
2	37	9,600	2.4	9,600	2.8	9.1	7.8	13.1	
3	37	7,500	1.1	5,850	2 42	8.8	[a] 4.0	[a] 7.9	
4	36	3,750	0 72	1,020	2 8	8.2	[a] 4.2	[a] 13	
6	35	1,220	0.30	405	4.28	16.5	[a] 5.92	[a] 16.9	
8	34	151	(1)	350	5.82	21.7	10.0	37.8	
11	33.5	162	(2)	152	8.62	16.2	11.2	39.5	
14	28	28.8	(1)	40	7.58	18.5	11.94	14.7	

[1] Depleted. [2] Trace.

TABLE 14.—*History of dissolved oxygen in cultures of bacteria only, of bacteria and alga, and of alga only, with atmospheric aeration meantime. In sunlight, with motion, every 6 minutes, in the elevator*

Days	Temperature, °C.	Bacteria only		Bacteria and alga			Alga only		Remarks
		Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)	D. O., p. p. m.	Alga in 1 cc (in p. p. m. by volume)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0	22.5	34.3	7.1	34.6	7.0	4.2	7.1	2.9	
1	31	5,950	5.35	6,200	5.20	6.8	7.15	7.7	
2	36	10,000	5.78	10,000	5.76	15.7	• 5.74	• 24	• Contaminated.
3	36	9,150	5.98	5,750	6.00	10.3	8.32	36	
4	38	1,260	5.88	940	6.52	9.3	7.38	28.3	
6	32	1,010	5.92	645	7.04	16.5	6.92	34.6	
8	35	198	6.62	248	6.98	17.8	7.00	35.2	
11	33	14.1	6.50	198	6.80	16.1	6.82	39.4	
14	28.5	67	6.90	117	7.40	19.1	7.40	43.5	

Table 14 presents the results obtained from cultures in the elevator, which cultures, in paired bottles, stoppered with cotton plugs, were exposed to atmospheric aeration through a thick mat of sterilized cotton. The contained liquid was mixed through an overhead siphon once in 6 minutes, as previously explained. In all other respects these cultures were exactly like those in the rotating cage, or those without motion on the shelf.

It will be noted in column 9, table 14, that the increase of alga cells is considerable, from an initial value of 2.9 parts to a final of 43.5 parts, yet the dissolved oxygen values are not appreciably larger than those in column 6, the cultures of which contain (see column 7) fewer alga cells. Looking into this matter a little further we may compare the results of alga growth in tables 12 and 14, respectively, excluding any contaminated cultures, as follows:

Taking the alga-only cultures of each, we note that in columns 8 and 9, in table 12, 7 cultures show an average content of 26.9 parts per million (by volume) of alga cells. These same cultures show a total accumulation, in 14 days, of 3.12 parts per million of alga-made oxygen (the initial content having been deducted). Meantime, as shown in table 14, the air-exposed cultures, similarly considered, indicate an average content of 32.1 parts per million of alga cells. These cells apparently produce, in 14 days, an accumulation of oxygen amounting to only 0.30 parts per million, or about one-tenth as much as was produced in the sealed cultures.

Apparently the only reasonable explanation of this discrepancy is the assumption that, in these unsealed cultures, some of the plant-made oxygen escaped to the air.[2]

[2] Birge and Juday, studying Lake Mendota, found excess plant-made oxygen only during calm weather. A breeze, setting the surface water in circulation, caused escape of excess oxygen to the air. (See p. 51 of reference no. 5).

Summary.—In brief summary of this final experiment, we submit the following items:

(1) Heavy decrease of the initial dissolved oxygen occurs in those sealed cultures which contain bacteria only.

(2) Sealed cultures containing both bacteria and alga cells record a similar drop in the initial dissolved oxygen at the time of greatest bacterial increase, but the growth of alga cells meantime produces sufficient oxygen to replace practically all of the consumed oxygen.

(3) Sealed cultures containing alga cells only show no decrease in the initial dissolved oxygen content, but a fairly uniform increase instead, obviously due to the output of oxygen from the alga.

(4) Cultures unsealed, but stoppered with cotton plugs, thus providing contact with the atmosphere, show, in bacteria-only cultures, a drop from the initial dissolved oxygen only half as great as the decrease shown by the sealed cultures meantime, though both cultures have similar bacterial content. Instead of further gradual depletion, as in the sealed cultures, these air-exposed cultures maintain a moderate oxygen content throughout the remaining days of the experiment.

(5) Similar unsealed and air-exposed cultures which contain both bacteria and alga cells show a dissolved oxygen history which is practically identical in all respects to the oxygen history stated in item (4) of those cultures which contain no alga cells. The bacterial content meantime is of about the same magnitude in each.

(6) Unsealed and air-exposed cultures containing no bacteria, but alga cells only, record no drop at all from the initial dissolved oxygen content. Neither is there any material increase in this content, notwithstanding a 1,400 percent increase of the contained alga cells. With but slight fluctuations, the initial content of dissolved oxygen is maintained throughout.

(7) The greatly differing dissolved oxygen history of all these air-exposed cultures, as compared with the like history of similar but sealed cultures, is apparently due to contact with the atmosphere, this stabilizing body supplying oxygen to some cultures when a partial deficit exists, or receiving the excess plant-made oxygen given off by other cultures, thus maintaining the oxygen content of all at a fairly uniform level. Atmospheric oxygen thus functions as an equalizing reservoir.

(8) Bacterial content is relatively low. It seems possible that the hot July sun, which developed a mean temperature of 33° C. within the cultures, is also the sufficient explanation of an intensity of sunlight which tended to kill some of the bacteria, as indicated in column 5 of tables 12 and 13.

DISCUSSION

The tabulated results of the foregoing experiments furnish reasonable evidence as to the replacement of dissolved oxygen used by bacterial growths, thus balancing and stabilizing the biochemical machine.

Tables 15 and 16 summarize the like data from 24 sets of cultures as recorded in 10 of the tables already given (nos. 1, 2, 3, 4, 6, 7, 9, 10, 12, and 13), and by averaging the daily results as there given, tables 15 and 16, recording those averages, are constructed (two tables are used because of differing dates of sampling after the fourth day). This final summary of the net results is further depicted by the two accompanying graphs.

TABLE 15.—*Summary of data from tables 1, 2, 6, 7, 12, and 13. Averages showing history of dissolved oxygen in 6 cultures of bacteria only, 6 cultures of bacteria and alga, and 2 cultures af alga only, with no atmospheric aeration meantime*

Days	Bacteria only		Bacteria and alga			Alga only	
	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Alga in 1 cc (p. p. m. by volume)	D. O., p. p. m.	Alga in 1 cc (p. p. m. by volume)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
0	19 4	7.89	19 2	7 91	2 57	7.10	2 90
1	3,709	5 80	3,572	5 69	4 33	7.02	8 20
2	7,165	4 87	6,537	5 04	5 29	8 10	14 80
3	6,265	4.25	5,915	5 53	8 10	9 00	17.40
4	5,173	4.08	3,072	5 92	15.21	10 90	30.50
5							
6	3,042	4.05	3,022	7 58	23.73	6 82	16.70
7							
8	1,924	4.38	1,252	9.51	42.48	10 28	36.95
9							
10	4,448	4 32	1,133	10 65	49 33		
11	162		113			11 20	39 50
14	53	.50	73	7.24	27.65	11 08	38 85

TABLE 16.—*Summary of data from tables 3, 4, 9, and 10. Averages showing history of dissolved oxygen in 4 cultures of bacteria only, 4 cultures of bacteria and alga, and 2 cultures of alga only, with no atmospheric aeration meantime*

Days	Bacteria only		Bacteria and alga			Alga only	
	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Bacteria in 1 cc (in thousands)	D. O., p. p. m.	Alga in 1 cc (p. p. m. by volume)	D. O., p. p. m.	Alga in 1 cc (p. p. m. by volume)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
0	13 8	8.49	15.6	8.40	3 48	8 40	5.40
1	4,180	5 77	3,156	6.41	7.66	8 64	11.60
2	9,275	4.68	9,813	4.92	7 51	9.02	16 50
3	9,513	4 25	10,025	5.19	13.96	12.38	61.20
4	9,125	3.93	9,338	4.60	14.56	12.17	93.15
5	10,613	3.94	10,525	5.33	18.79	12.75	93.70
6							
7	8,025	3.75	7,070	5.63	24.01	12.66	145.20
8							
9	4,667	2.69	5,207	5.93	33.57	12.69	184.45
10							
11	6,523	2 94	6,213	6.19	17.70	12.96	111.95
14	3,860	0.19	1,805	7.17	26.95	12.77	124.25
17	5,200	0.00	2,630	7.54	26.00	14.56	126.00

In our experiments, our chief object was to learn the trend of such results and the direction of such change as might be expected to occur during natural weather conditions and in the natural waters with which we ordinarily are concerned. The outstanding and persistent change noted (i. e., the measurable quantity of oxygen produced by a

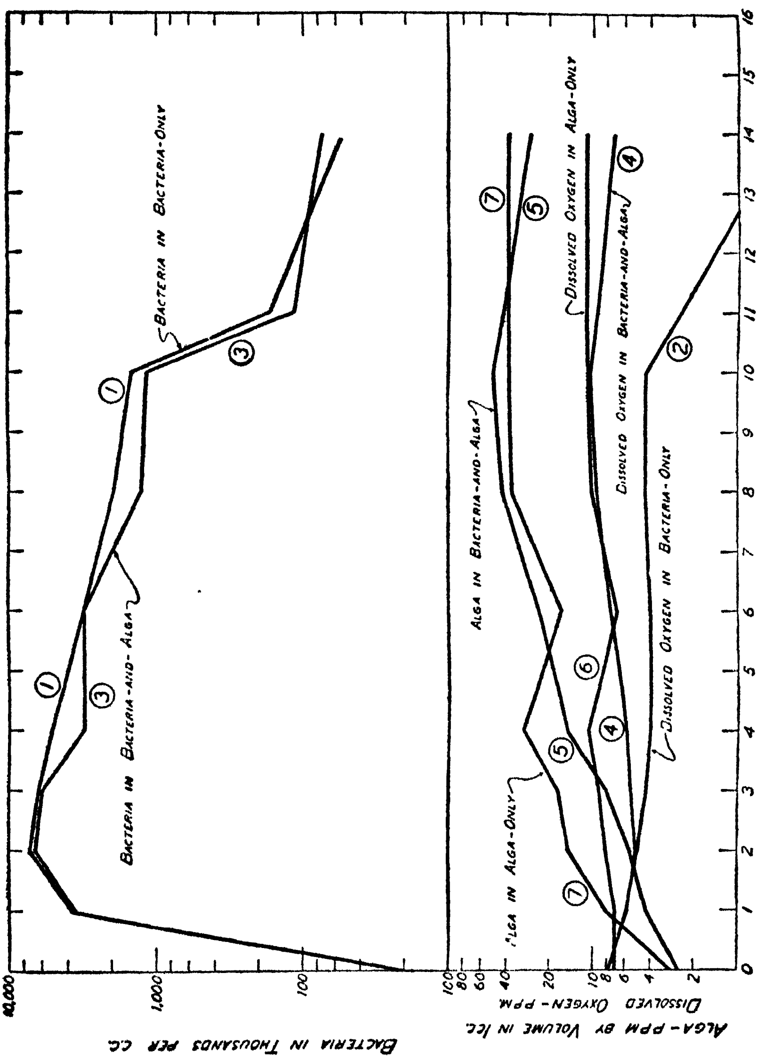

CHART 1.—Graphic presentation of table 15. The very similar bacterial histories shown in curves 1 and 3 are associated with the very dissimilar dissolved oxygen histories shown in curves 2 and 4. The increasing space between curves 2 and 4 shows the net effect of alga-produced oxygen in curve 4, while curve 2 shows depletion in the absence of alga.

relatively small volume of algal cells), is significant not only because of the great importance of this oxygen to the polluted water, but also because of the prevalence of conditions meantime in our experiments, which are mainly natural rather than artificial. This refers to (1) such sunlight as was available during these several periods of experi-

mentation, (2) such temperature as the natural weather provided, and (3) such dissolved organic content as is comparable to a heavily-polluted water in nature. Similarly (4), the content of algal cells was not greater than that which we commonly find in such sun-exposed waters in nature; in fact, the alga content of a natural water is often

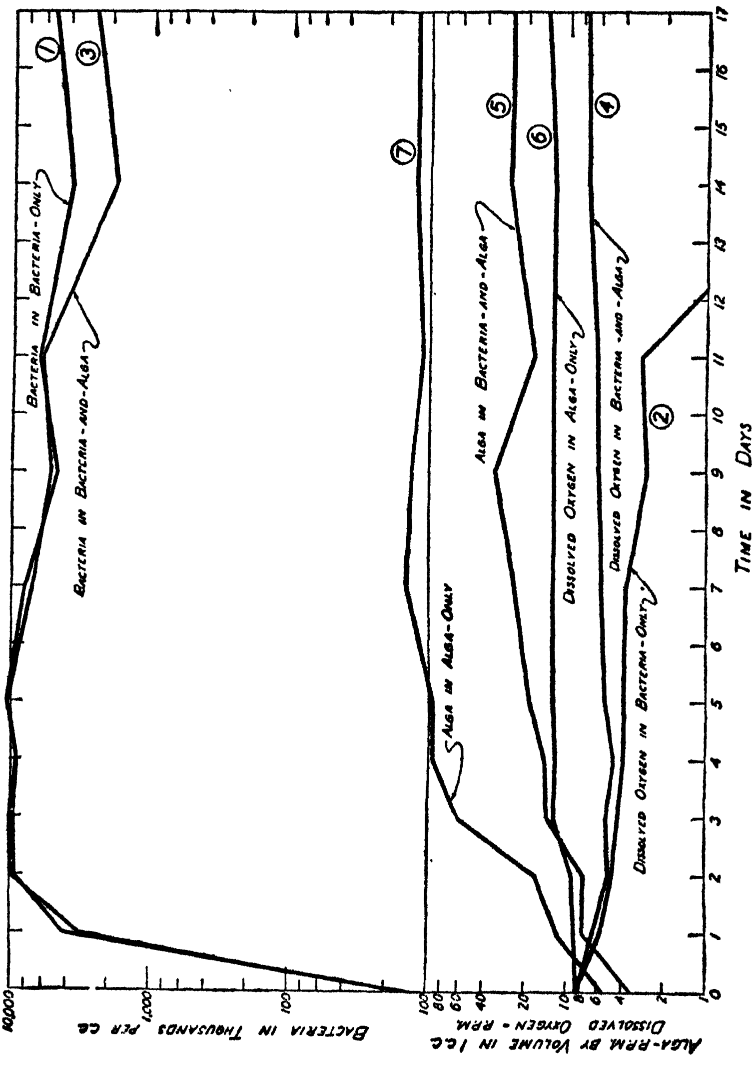

CHART 2.—Graphic presentation of table 16. The very similar bacterial histories shown in curves 1 and 3 are associated with the very dissimilar dissolved oxygen histories shown in curves 2 and 4, the increasing space between these latter indicating the replacement of dissolved oxygen in 4 by the growing alga (curve 5) while in curve 2, in the absence of alga, depletion results.

much higher than that of our cultures. On the other hand, proper checking of our results necessitated certain limitations not found in nature. Chief of these were (1) limiting the amount of any one culture to 300 cubic centimeters, (2) enclosing this within a bottle and sealing to prevent contact with external air, (3) passing of sunlight

through window glass and also through the glass sides of the bottle, before reaching the organisms of the culture, and (4) limiting the contained organisms to one kind only, or to two kinds at most.

Our claim, therefore, is not for mathematical exactness, but rather for the inevitable direction and relative amount of change involving the dissolved oxygen content of such waters as contain even moderate quantities of algal cells and are exposed to such sunlight as is afforded by ordinary weather conditions. The quantitative note is persistent and unmistakable by the production, in every instance (except in those cultures incubated in darkness) *of sufficient amounts of this alga-made oxygen to replace nearly or quite all that has been consumed by the rising bacterial content,* and thus the disaster of oxygen depletion is prevented.

Approximate unit production of oxygen by alga cells.—While the exact quantity of oxygen produced by photosynthesis is a complicated problem (*23*, *24*) involving many factors, yet, we have, in the tables presented herewith, sufficient data to approximate the quantity of oxygen formed by a representative unicellular alga under conditions of temperature, available sunlight, and degree of pollution fairly typical of the average situation in nature. In partial answer to the question, What may we expect of the algae usually present in a natural water body? we submit the following items:

A. Production in cultures of alga only;

B. Production in cultures of alga-and-bacteria.

A. The alga-only sections of tables 9, 10, 12, and 13 furnish data by which we may approximate the quantitative production of oxygen by the alga used.

Utilizing for the present that portion of any given table which records uninterrupted day-to-day values, we note, in table 9:

The initial dissolved oxygen content of 8.40 parts increases in 5 days to 12.90 parts, indicating that the alga present has produced 4.50 parts.

The average content of alga in the meantime (omitting two contaminated samples) is 63.97 parts.

This average content of alga producing a known amount of oxygen in a known number of days gives all the data required to find that, in 1 day, 1 part per million of alga produces 0.014 parts per million of oxygen.

In like manner, we find the amount of oxygen produced per part per million of alga per day in tables 10, 12, and 13. The results are recorded in the final column of table 17.

Table 17.—Unit production of oxygen in the alga-only portions of tables 9, 10, 12, and 13

Table	Consecutive days	Dissolved oxygen: Initial	Dissolved oxygen: Final	Dissolved oxygen: Produced by alga	Average alga content (p. p. m. by volume)	Oxygen produced per day per p. p. m of alga (p. p. m.)
9	5	8 40	12.90	4 50	63.97	0.014
10	5	8 40	12.60	4 20	56 54	.015
12	4	7.10	10 90	3.80	18.15	.052
13	2	7.10	7.80	.70	10.05	.035

B. Seeking similar information in the sections relating to bacteria and alga of tables 1, 2, 3, 4, 6, 7, 9, 10, 12, and 13, respectively, it becomes necessary to expand each table in order to make accessible the somewhat involved data. For example, table 9 becomes:

TABLE 18.—*Expansion of Table 9*

Day	Bacteria only				Bacteria and alga					
	Temperature° C	Bacteria in 1 cc (in thousands)	Dissolved oxygen (p. p. m.): Content	Dissolved oxygen (p. p. m.): Used	Bacteria in 1 cc (in thousands)	Dissolved oxygen: Used	Dissolved oxygen: Total content	Dissolved oxygen: From initial	Dissolved oxygen: From alga	Alga in 1 cc (p. p. m. by volume)
(1)	(2)	(3)	(4)	(A)	(5)	(B)	(6)	(C)	(D)	(7)
0	22	18.9	8 52		22.6		8.50	8.50		4.4
1	22 5	6,030	4 48	4.04	6,140	4.10	4 96	4 40	.56	10.3
2	22.5	10,800	3 48	1.00	10,400	.97	4 22	3 43	.79	10 4
3	30	11,000	3 22	.26	11,000	.26	5.08	3 17	1 91	24.2
4	23	11,100	2 22	1.00	11,400	1.03	4 50	2.14	2 36	30.6
5	26	12,000	2.52	—.30	14,000	—.35	4.80	2.49	2 31	44.5
6										[1] 44 6
7	27.5	8,550	1 82	.70	6,550	.54	4 48	1.95	2.53	44 6
8										[1] 50 75
9	29	4,400	.42	1.40	3,370	1.07	5.12	.88	4 24	56.9
10										[1] 38.30
11	22 5	6,700	Depl.	.42	5,300	.33	4.63	.55	4.08	19 7
12										[1] 22.0
13										[1] 24 3
14	30 5	1,620	Depl.	.0	1,390	.0	6.34	.55	5 79	26.6

[1] Extrapolated value.

The "expansion" consists in introducing columns A, B, C, and D. (The numbered columns 1 to 7, inclusive, are identical with those in the original table 9.)

Column A is derived by tabulating day by day the amount of oxygen used, as shown by the daily decrease in column 4.

Column B is derived by ascertaining the proportional amount of oxygen used by the daily bacterial content shown in column 5, as compared with the known amounts (see column A) used by the similar daily bacterial content in column 3. By using for each day's data, the proportion column 3 : column 5=column A : column B, the amount for each day in column B is found. For example, 6030 : 6140= 4.04 : x (=4.10).

Since the total amount of dissolved oxygen present (column 6) consists in part (1) of that present at the start (initial) and in part (2) of oxygen made by the alga during the days of the experiment, these two components may be differentiated by recording, in column C, the successive amounts remaining after deducting, from the initial content, the first-day item in column B, then from the remainder deducting the next successive item in column B, and so on. The resulting column C shows each day's remnant of such oxygen as was present at the start (initial content).

But the total amount of oxygen found to be actually present each day (column 6) is usually more than that shown in the items in column C. The alga is the only possible source of this additional oxygen; and as the alga increases from day to day (column 7), the amount of alga-made oxygen should increase also. By subtracting each item in column C from the item of the same date in column 6, the daily record of these differences is obtained, and this is recorded in column D. These same items represent the successive daily accumulations of alga-made oxygen, since, in the sealed bottles, there was neither access of atmospheric oxygen nor escape of such oxygen as was generated by alga within the bottles. The oxygen present in column D on any given day (for example, day 4) represents not only the oxygen formed on that day, but also the accumulated oxygen formed on preceding days.

The alga, introduced into cultures at the start in very small amount, increases much more slowly (see column 7 in tables 1, 2, 3, 4, 6, 7, and 13) than do bacteria, with the result that only very small amounts of alga-made oxygen are present for 3 or 4 days. These small amounts may even be within the range of experimental error, and in several instances negative values are indicated. Under such conditions only approximate values are warranted, and the trend of the experiment as a whole is probably the only data of actual value (see table 19). An attempt to deduce reliable values from the very small and frequently negative day-to-day quantities furnished by the small but increasing quantities of alga in our experiments would seem unwarranted. Temperature fluctuations in particular are much in evidence and constitute a hazard in the attempt to interpret dissolved oxygen values when expressed in terms of parts per million.

The day-to-day results recorded in table 20 are submitted, but with realization of the doubtful value of the data, as previously stated.

The experiments as carried out result in incomplete tables in that certain days are omitted in order to conserve the limited number of cultures and prolong the experiment thereby. This incompleteness is a feature of tables 1 to 14, inclusive.

By recourse to extrapolation, the missing values have been supplied (see note to table 18) in order to arrive at a better established value to represent the daily production of oxygen by a given quantity of alga.

The extrapolation has been applied, in each expanded table, only to such data (column 7 in table 18) as was necessary in order to compute the desired value. Knowing (1) the average alga content per day, (2) the total amount of alga-made oxygen accumulated, and (3) the number of days required for this accumulation, we have *accumulation of oxygen* divided by *average alga content*, and the resulting quotient further divided by *number of days of activity*, giving the average quantity of oxygen produced per unit of alga per day. The results thus obtained are recorded in table 19.

TABLE 19.—*Unit production of dissolved oxygen in the bacteria-and-alga section of tables 1, 2, 3, 4, 6, 7, 9, 10, 12, and 13*

Experiment no.	Table	Approximate per cent of sunlight	Average oxygen produced per day per p p m (by volume) of alga (Oocystis) (p. p m)	Experiment no.	Table	Approximate per cent of sunlight	Average oxygen produced per day per p p m. (by volume) of alga (Oocystis) (p. p. m.)
1	1	19	0.043	4	9	25	0.014
	2	19	.028		10	25	.017
2	3	10	.027	5	12	36	.02
	4	10	−.005		13	36	.04
3	6	18½	.01				
	7	18½	.02				

TABLE 20.—*Approximate production of oxygen per day by one part per million (by volume) of oocystis cells. Daily results from cultures containing bacteria and alga*

Day	Table 1	Table 2	Table 3	Table 4	Table 6	Table 7	Table 9	Table 10	Table 12	Table 13
1	−1.8	0	0.02	−0.03	−0.16	0.04	0.08	−0.08	−0.08	0.09
2	.6	−.82	−.13	−.45	.37	.29	.02	.07		.03
3	.25	.03	.22	.09	.21	.06	.06	.03	.09	.07
4	.14	.24	.03	.07	.04	.05	.02	−.02	−.06	.06
5			−.02	−.04			−.001	.16		
6	.04	.20			.02	.04			.04	.07
7			.04	−.04			.003	.01		
8	.07	.005			.01	.02			.08	.06
9			.04				.02	.02		
10	.03	.02			−.02	−.001				
11			.01	.01			−.002	.03		.05
14							.02	.03	.03	−.02
17								−.003		

While the five experiments yield somewhat discordant data, it nevertheless seems fair to attach some importance to the tentative figures in tables 17 and 19, indicating the actual amount of reoxygenation from a given alga content working under ordinary day-to-day fluctuations of temperature and sunlight during natural weather. In every case the moderate content of algal cells sufficed to produce enough oxygen to replace practically all the oxygen used by the bacteria, in some cases even producing supersaturation, and in all cases avoiding, by a wide margin, the disaster of oxygen depletion.

Cultures in darkness (tables 5, 8, and 11) give significant results. In the absence of light, the algal cells apparently do not function, for the dissolved oxygen history in cultures which contain alga, together with bacteria (see column 6) is almost identical with that in the bacteria-only cultures (see column 4) in every one of these three experiments. In the one case (table 11, columns 8 and 9) where alga cells multiplied even in darkness, apparently this produced no oxygen, for the initial content of 8.4 parts was not increased, but was *reduced,* in 17 days, to about 5.0 parts, probably by respiration of the algal cells themselves.

Practical bearings.—Since the content of dissolved oxygen is a widely used measure in water examination, the possible source of such oxygen should be recognized and evaluated. Such evaluation must necessarily be guided by consideration of the relative abundance of submerged plants present and by the prevailing weather conditions as to sunlight. Diatoms sufficiently abundant to clog the filters may meantime be a valuable source of oxygen to that particular water. Night conditions of a polluted stream might be intolerable without the excess of oxygen previously provided by algae. Seasonal conditions are to a considerable extent secondary, because numerous algae and chlorophyll-bearing organisms are frequently abundant during cold weather; and even under a seal of ice, if this be clear enough to admit sunlight, certain organisms are apparently capable of producing sufficient oxygen to saturate the water, or to produce supersaturation if the ice seal prevents escape of excess oxygen to the air.

Marsh (*25*) found *Synedra* abundant in Lake Winnebago in the depth of winter for three successive winters. Knauthe (*26*), studying ponds covered with ice, records a dissolved oxygen content 515 percent saturation, this water containing in the meantime a very large growth of chlorophyll-bearing organisms. Olson (*13*), studying Minnesota lakes, records 115 percent saturation in the water of a lake sealed with clear, snow-free ice nearly 3 feet thick, through which green water plants were visible.

Probable relative absorption of plant-made oxygen and of atmospheric oxygen.—If algae be present, a measurable amount of pure oxygen is usually produced thereby within the water. Under natural conditions this water is in contact with the atmosphere, which is a mixture of gases, essentially 4 parts nitrogen and 1 part oxygen. The water, having a given "demand" for oxygen, will necessarily satisfy this demand by absorption from any stock or supply of oxygen available.

If this absorption takes place from the atmospheric supply at the water surface, such absorption must be in conformity with the fact that this oxygen, constituting about 21 percent of the atmosphere, is subject to a vapor pressure of only one-fifth that of pure oxygen. If absorption takes place from the alga-produced supply already within

the water, this supply, being pure, has a vapor pressure of about five times that of the atmospheric supply.

Discussing the amount of certain gases dissolved in natural waters, Whipple and Parker (*22*) say: "In a mixture of gases, the quantity of any one dissolved depends on the vapor pressure of that gas, regardless of the others. Thus a liter of water at 0° C. will dissolve 41.14 cc of oxygen if exposed to pure oxygen (at one atmosphere), but exposed to air (which is one-fifth oxygen) it will absorb 41.14 cc of oxygen under one-fifth the pressure, hence one-fifth as much by weight as in the first case."

In their exhaustive study of Wisconsin lakes, Birge and Juday (*5*) state (p. 25): "In a mixture of gases, such as the air, the absorption of each gas is independent of all the other gases present and is proportional to the pressure exerted by that gas."

Birge and Juday very frequently found the largest quantities of dissolved oxygen (100 to 300 percent saturation) not at the surface, but at depths varying from 1½ to 5 meters, at which depths, in these clear waters, there was sufficient light to enable the algae to function. In several of these instances the quantity of algae was considerably greater at these depths than in the surface waters.

Collection of the dissolved oxygen sample.—We would again point out, as we did some years ago (*7*), the very marked effect of submerged green plants, plus sunshine, on the dissolved oxygen content of the water and the resulting great difference in samples collected on sunny days as compared with cloudy-day samples, or afternoon samples as compared with morning samples. The time of collection must be selected with the same extreme care that we use in the selection of the place where the sample is to be collected. This essential fact has been further indicated in no uncertain terms by the studies of Rudolfs and Heukelekian (*9*), by Mohlman and his associates (*8*), by Streeter (*20*), by Calvert (*14*), by Olson (*13*), and by Hubbs (*15*). Not only should the deposits of decomposable sludge be recognized for their potential and actual effect on the oxygen expenditure of the stream, as contended by Mohlman and by Streeter, but the somewhat analogous content of resident submerged plant life and of microscopic algae should be adequately evaluated also, for their potential and actual effect on the oxygen income of the stream or water body concerned.

SUMMARY

1. Minute cells of green algae, sufficiently numerous to tint the water a scarcely perceptible green, and under average daily conditions as to sunlight, produced measurable amounts of dissolved oxygen.

2. The medium used simulated heavily polluted water, in that it contained sufficient dissolved organic matter to sustain a bacterial content which, in various separate experiments, reached maxima

varying from 5 millions to 13 millions per cc. However, only one kind of bacterium was present, and there were no protozoa, predatory or otherwise.

3. All cultures (those in table 14 excepted) were in completely filled bottles. Atmospheric aeration was eliminated. Duration of the experiments varied from 10 to 17 days.

4. Cultures containing bacteria but no alga cells showed serious decreases in dissolved oxygen, this sometimes being entirely depleted.

5. Cultures containing the minute alga in addition to the bacteria showed similar decrease of initial dissolved oxygen, but a program of recovery and replacement soon developed, becoming noticeable about the third day, when dissolved oxygen began to increase, coincident with increase in number of alga cells. This oxygen always prevented depletion by a wide margin, and sometimes produced supersaturation.

6. Cultures containing no bacteria, but alga cells only, showed no decrease of initial dissolved oxygen, but a progressive increase, corresponding in general with the daily increase in alga cells.

7. Check cultures in darkness in the 20° C. incubator showed (a) growth of bacteria similar to that in the cultures exposed to light, (b) no increase, or slight increase, of alga cells, (c) no replacement of dissolved oxygen.

8. Cultures having contact with the air show results very different from those shown by sealed cultures. The drop in initial oxygen is about one-third as great, then remains relatively stable, neither becoming depleted nor regaining an excess from algal activity. The alga-made oxygen as shown by titration is only about one-tenth the amount obtained from similar quantities of alga in the sealed cultures meantime. Apparently, exposure to the air, as obtains under conditions in nature, permits escape of most of the oxygen.

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MORTALITY AMONG SOUTHERN NEGROES SINCE 1920

Facts pertaining to the health of the Negro in the United States must be largely confined to statistics of mortality, since no large body of data on the incidence of illness among them is at present available. Mortality data, however, are published annually by the Bureau of the Census. In 1920 these reports embraced approximately two-thirds of the Negro population, but the death registration area has been gradually extended, and in 1933 it included the entire country. The Public Health Service has recently issued a bulletin [1] summarizing

[1] Public Health Bulletin No. 235, prepared in the Office of Statistical Investigations by Dr. Mary Gover. This bulletin may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 10 cents per copy.

these data on Negro mortality. It is confined largely to Negroes of the Southern States, although some comparisons are made with mortality among northern Negroes and southern whites. Much of the material is presented in graphic form, and detailed tables have been included in the appendix. The bulletin includes a consideration of such questions as the course of mortality since 1920 from all causes and from specific causes, mortality among males and females and in urban and rural areas, the major causes of death among Negroes, the relative importance of specific causes of death among Negroes as compared with whites, and age-specific mortality for detailed causes of death.

Mortality from all causes for all ages declined during the years 1922 to 1932 a total of 2.5 percent among the colored and 7.7 percent among the white population. Each age group under 30 among the colored and under 45 years among the white showed a decline. Over those ages the recorded mortality increased for both races, the percentage increase being more for the colored than for the white.

On the whole the changes in mortality from specific causes have been in the same direction, and for many of the specific causes the change has been at approximately the same rate for both races. The principal causes for which the mortality rates have declined are the acute infectious diseases, respiratory tuberculosis, stomach diseases, and diseases of early infancy. Cancer, arteriosclerosis, and chronic heart diseases have been increasing at about the same rates for colored and white, but acute heart disease and cerebral hemorrhage have increased faster among the colored. The recorded mortality from syphilis has increased more rapidly among colored, and the recorded mortality from locomotor ataxia and general paralysis of the insane has decreased for white and remained about stationary for colored.

Ratios of colored to white death rates at specific ages show that the largest relative differences between colored and white mortality occur in the ages from 15 to 54 years.

With the exception of the age group up to 4 years, colored males and females of the same ages show the same rates of mortality. The relative difference between colored and white females is larger than that between colored and white males, particularly at 15 to 64 years of age. Urban mortality is relatively higher for colored than for white, especially during the active working ages.

Age curves of mortality are shown for specific causes. In the age group from 15 to 44 years respiratory tuberculosis and heart disease account for 30 to 40 percent of the total excess of colored over white mortality. The maximum relative difference between colored and white mortality occurs in early adult life; the peak of the relative excess comes at ages 10 to 14 for respiratory tuberculosis, at 20 to 24

for the infectious diseases, nervous diseases, and pneumonia, at 25 to 34 years for cancer, diseases of the heart, and diseases of the arteries, and at 35 to 44 years for digestive diseases and diseases of the kidneys.

ANOPHELES MOSQUITOES FOUND AT 10,500 FEET ELEVATION IN GUATEMALA

Dr. Romeo de Leon, of the Guatemala Department of Health, has recently reported the finding of *Anopheles* mosquitoes at an altitude of 10,500 feet in the Huehuetenango region of the Republic of Guatemala. This discovery was made while Dr. de Leon was on a 2-months' trip through that region in western Guatemala. The greatest altitude at which these mosquitoes had previously been found in the Republic is reported to be 8,500 feet, at which elevation they had been observed in the Quezaltenango region, which is also in the western part of the Republic.

DEATHS DURING WEEK ENDED JUNE 26, 1937

(From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended June 26, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	7,612	7,818
Average for 3 prior years	7,637	
Total deaths, first 25 weeks of year	234,[illegible]	230,781
Deaths under 1 year of age	721	560
Average for 3 prior years	529	
Deaths under 1 year of age, first 25 weeks of year	11,171	11,438
Data from industrial insurance companies:		
Policies in force	69,933,379	68,470,070
Number of death claims	12,242	11,653
Death claims per 1,000 policies in force, annual rate	9.1	8.9
Death claims per 1,000 policies, first 25 weeks of year, annual rate	10.7	10.6

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 3, 1937, and July 4, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 3, 1937	Week ended July 4, 1936	Week ended July 3, 1937	Week ended July 4, 1936	Week ended July 3, 1937	Week ended July 4, 1936	Week ended July 3, 1937	Week ended July 4, 1936
New England States:								
Maine	-	-	2	-	19	169	0	1
New Hampshire	-	-	-	-	30	2	0	0
Vermont	1	-	-	-	2	58	0	0
Massachusetts	5	1	-	-	288	460	2	1
Rhode Island	1	-	-	-	37	3	0	0
Connecticut	4	2	1	1	45	78	0	0
Middle Atlantic States:								
New York [1]	31	33	([2]) 5	[2] 1	891	1,307	4	11
New Jersey	10	3	2	1	393	262	0	1
Pennsylvania	19	43	-	-	927	616	8	5
East North Central States:								
Ohio	20	11	9	6	1,342	197	2	1
Indiana	10	7	2	7	271	15	1	1
Illinois	21	29	8	3	490	17	1	8
Michigan	17	10	-	1	218	29	2	7
Wisconsin	2	1	14	8	53	102	0	0
West North Central States:								
Minnesota	-	-	-	-	2	72	2	0
Iowa [3]	2	5	-	-	15	6	3	0
Missouri	6	3	18	11	80	8	0	0
North Dakota	-	-	-	-	1	1	0	1
South Dakota	3	2	-	-	-	5	0	0
Nebraska	1	3	-	-	6	14	1	1
Kansas	11	6	1	3	15	-	0	0
South Atlantic States:								
Delaware	-	5	-	-	3	7	1	0
Maryland [1 3 4]	7	3	-	1	79	186	1	7
District of Columbia	5	14	-	-	42	57	1	0
Virginia	8	4	-	-	64	89	4	9
West Virginia	7	4	25	3	30	15	4	2
North Carolina [3]	5	8	-	-	134	15	3	4
South Carolina	-	1	28	37	18	14	0	1
Georgia [1]	4	3	-	-	-	-	0	2
Florida [1]	1	1	1	-	-	6	0	1
East South Central States:								
Kentucky	1	3	-	1	98	7	1	4
Tennessee	3	5	1	33	71	35	2	4
Alabama [1]	5	5	5	3	20	8	4	0
Mississippi [4]	3	5	-	-	-	-	1	1
West South Central States:								
Arkansas	5	3	2	6	7	-	3	0
Louisiana	6	1	13	9	3	11	0	0
Oklahoma [5]	1	5	5	12	23	7	0	0
Texas [1]	20	21	76	63	171	86	3	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 3, 1937, and July 4, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 3, 1937	Week ended July 4, 1936	Week ended July 3, 1937	Week ended July 4, 1936	Week ended July 3, 1937	Week ended July 4, 1936	Week ended July 3, 1937	Week ended July 4, 1936
Mountain States:								
Montana	1				4	8	0	0
Idaho [3]		1	2		8		0	0
Wyoming [3]		1				1	0	0
Colorado	10	2			49	10	0	0
New Mexico	1	4		3	23	18	0	0
Arizona	3	3	15	25	14	27	0	0
Utah [4]		1			58	36	0	0
Pacific States								
Washington	1	1			72	97	1	1
Oregon [3]	4		10	4	9	14	0	0
California	25	24	14	441	97	1,467	6	4
Total	[illegible]	287	259	686	6,225	5,642	61	78
First 26 weeks of year	11,649	12,685	272,835	138,583	224,733	256,289	3,709	5,403

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 3, 1937	Week ended July 4, 1936	Week ended July 3, 1937	Week ended July 4, 1936	Week ended July 3, 1937	Week ended July 4, 1936	Week ended July 3, 1937	Week ended July 4, 1936
New England States:								
Maine	1	0	11	6	0	0	2	0
New Hampshire	0	0	6	1	0	0	1	0
Vermont	0	0	5	15	0	0	0	0
Massachusetts	2	0	122	74	0	0	1	2
Rhode Island	0	0	10	6	0	0	0	0
Connecticut	0	0	37	14	0	0	0	0
Middle Atlantic States:								
New York [1]	2	3	235	293	0	0	19	8
New Jersey	2	1	57	80	0	0	1	3
Pennsylvania	1	1	284	[illegible]	0	0	17	14
East North Central States								
Ohio	2	0	152	98	8	0	8	9
Indiana	0	1	42	27	9	1	3	0
Illinois	2	2	183	235	28	17	8	6
Michigan	1	0	337	204	0	0	4	5
Wisconsin	0	0	113	136	1	9	0	2
West North Central States:								
Minnesota	0	0	49	61	7	13	0	2
Iowa [3]	0	0	52	41	20	7	3	2
Missouri	1	1	35	26	10	6	31	6
North Dakota	0	0	5	3	12	3	0	0
South Dakota	0	0	11	15	4	4	0	0
Nebraska	1	0	8	16	2	10	0	0
Kansas	2	0	46	51	6	2	6	5
South Atlantic States:								
Delaware	0	0	2		0	0	2	0
Maryland [1 3 4]	0	0	14	24	0	0	9	2
District of Columbia	0	0	4	9	0	0	7	0
Virginia	1	1	1	13	0	0	6	1
West Virginia	1	1	18	20	0	1	7	2
North Carolina [3]	7	0	14	5	0	0	30	6
South Carolina	1	0	1	2	0	0	20	9
Georgia [1]	4	3	10	4	0	0	50	22
Florida [1]	0	1	7	2	0	0	4	0
East South Central States:								
Kentucky	2	1	17	14	0	0	13	16
Tennessee	[6] 19	1	1	18	1	0	32	17
Alabama [1]	2	36	4	7	0	0	10	10
Mississippi [4]	30	0	5	4	0	0	17	15
West South Central States:								
Arkansas	26	0	9		0	0	29	4
Louisiana	7	0	8	5	0	0	19	20
Oklahoma [5]	7	1	7	10	3	0	7	11
Texas [1]	23	0	40	13	1	0	[illegible]	[illegible]

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 3, 1937, and July 4, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 3, 1937	Week ended July 4, 1936	Week ended July 3, 1937	Week ended July 4, 1936	Week ended July 3, 1937	Week ended July 4, 1936	Week ended July 3, 1937	Week ended July 4, 1936
Mountain States:								
Montana	0	0	9	14	11	19	1	2
Idaho [3]	1	0	11	2	7	2	2	3
Wyoming [3]	0	0	12	11	0	0	1	0
Colorado	1	0	10	26	2	2	2	0
New Mexico	0	0	5	23	2	0	2	7
Arizona	1	0	1	2	0	0	4	3
Utah [4]	0	0	11	19	1	8	0	3
Pacific States:								
Washington	1	0	13	14	2	3	1	14
Oregon [3]	0	0	12	7	5	2	2	9
California	7	7	93	152	9	3	5	5
Total	158	61	2,139	2,201	151	112	421	280
First 26 weeks of year	815	523	157,273	170,813	7,370	5,522	3,791	3,719

[1] Typhus fever, week ended July 3, 1937, 59 cases, as follows: New York, 2; Maryland, 2, Georgia, 17; Florida, 7, Alabama, 21, Texas, 7

[2] New York City only

[3] Rocky Mountain spotted fever, week ended July 3, 1937, 14 cases, as follows. Iowa, 2, Maryland, 4, North Carolina, 1 Idaho, 1, Wyoming, 1, Oregon, 2.

[4] Week ended earlier than Saturday

[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa.

[6] Two nonparalytic cases included.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May 1937										
Florida	7	31	22	54	118		2	34	0	12
Montana		2	38		65		0	73	64	2
North Dakota	2	2			5		0	122	76	5
Oregon		8	99	3	43		3	186	50	9
Wisconsin	1	17	113		263		1	1,092	8	6

May 1937

	Cases
Chicken pox:	
Florida	119
Montana	121
North Dakota	81
Oregon	216
Wisconsin	2,590
Dysentery:	
Florida (bacillary)	2
Wisconsin (amoebic)	1
Encephalitis, epidemic or lethargic:	
Wisconsin	1
German measles:	
Wisconsin	122
Hookworm disease:	
Florida	663
Impetigo contagiosa:	
Montana	4
Oregon	32
Mumps:	
Florida	120
Montana	259

May 1937—Continued

	Cases
Mumps—Continued	
North Dakota	42
Oregon	46
Wisconsin	722
Paratyphoid fever:	
Florida	5
Rabies in animals:	
Oregon	4
Rocky Mountain spotted fever:	
Montana	6
North Dakota	1
Oregon	16
Scabies.	
Montana	1
Oregon	21
Septic sore throat:	
Montana	17
Oregon	7
Wisconsin	10
Tick paralysis:	
Montana	1

May 1937—Continued

	Cases
Trachoma	
Montana	2
Trichinosis	
Florida	15
Tularaemia:	
Montana	3
Typhus fever.	
Florida	4
Undulant fever:	
Wisconsin	9
Vincent's infection:	
Florida	9
Montana	1
North Dakota	2
Oregon	10
Whooping cough:	
Florida	63
Montana	71
North Dakota	30
Oregon	116
Wisconsin	458

WEEKLY REPORTS FROM CITIES

City reports for week ended June 26, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	171	58	21	3,637	394	1,134	11	395	54	1,468	--------
Current week [1]	126	20	16	2,594	353	945	12	397	43	1,334	--------
Maine:											
Portland	0	------	0	0	1	2	0	1	0	2	20
New Hampshire.											
Concord	0	------	0	0	0	0	0	0	0	0	3
Manchester	0	------	0	0	0	0	0	0	0	0	11
Nasnua	0	------	0	0	0	1	0	1	0	0	6
Vermont:											
Barre	0	------	0	0	0	0	0	0	0	0	3
Burlington	1	------	0	0	0	0	0	0	0	0	5
Rutland	0	------	0	0	1	1	0	1	0	0	7
Massachusetts.											
Boston	1	------	0	27	14	37	0	16	1	35	185
Fall River	1	------	0	51	0	0	0	1	0	2	20
Springfield	0	------	0	0	1	5	0	4	1	5	36
Worcester	2	------	0	7	3	4	0	5	0	4	--------
Rhode Island:											
Pawtucket	1	------	0	0	0	0	0	0	0	0	11
Providence	0	------	0	34	2	20	0	1	0	39	50
Connecticut:											
Bridgeport	0	------	0	0	0	22	0	0	0	0	22
Hartford	1	------	0	13	4	1	0	0	0	5	34
New Haven	0	------	0	2	1	3	0	1	1	1	30
New York:											
Buffalo	0	------	0	37	9	8	0	5	0	17	120
New York	38	2	0	536	65	99	0	83	10	81	1,278
Rochester	0	------	0	11	2	9	0	0	0	14	57
Syracuse	0	------	0	10	3	4	0	0	0	27	34
New Jersey.											
Camden	0	1	1	3	0	2	0	0	0	1	26
Newark	0	------	1	10	8	8	0	5	0	10	82
Trenton	0	------	0	32	0	2	0	6	0	4	26
Pennsylvania:											
Philadelphia	2	------	0	28	14	61	0	19	6	63	393
Pittsburgh	2	------	1	253	16	26	0	6	3	49	177
Reading	0	------	0	18	1	3	0	1	0	3	21
Scranton	0	------	--------	1	------	5	0	------	0	2	--------
Ohio:											
Cincinnati	0	1	6	12	6	10	0	12	0	34	129
Cleveland	5	1	0	369	15	28	0	13	2	37	174
Columbus	0	1	1	21	0	2	0	1	0	15	63
Toledo	4	2	1	184	2	2	0	9	0	38	68
Indiana											
Anderson	0	------	0	21	0	1	0	0	0	2	11
Fort Wayne	----	------	------	------	------	------	------	------	------	------	--------
Indianapolis	0	------	1	99	6	5	0	5	0	34	114
South Bend	0	------	1	0	1	1	1	1	0	0	14
Terre Haute	0	------	0	1	0	1	1	0	0	0	19
Illinois											
Alton	0	------	0	0	1	1	0	0	0	0	7
Chicago	26	1	0	405	27	120	0	48	0	62	691
Elgin	0	------	0	0	0	0	0	0	0	0	6
Moline	0	------	0	1	0	0	1	0	0	4	13
Springfield	0	------	0	5	0	1	0	0	0	6	33
Michigan:											
Detroit	9	------	0	110	9	238	0	17	1	38	282
Flint	0	------	0	2	4	4	0	1	0	2	26
Grand Rapids	0	------	0	21	0	8	0	0	0	17	27
Wisconsin:											
Kenosha	0	------	0	1	0	6	0	0	0	0	8
Madison	0	------	0	1	0	1	0	0	0	10	23
Milwaukee	0	------	0	11	7	35	0	2	1	20	113
Racine	0	------	0	0	0	2	0	0	0	0	7
Superior	0	------	0	0	1	1	0	0	0	3	8

[1] Figures for Fort Wayne, Ind., estimated; report not received.

City reports for week ended June 26, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Minnesota:											
Duluth	0	------	0	0	1	13	0	4	0	1	25
Minneapolis	1	------	0	0	2	16	0	0	0	0	64
St. Paul	0	------	0	0	5	0	0	1	0	72	63
Iowa:											
Cedar Rapids	0	------	------	1	------	1	0	------	0	1	------
Des Moines	0	------	0	1	0	4	3	0	0	0	27
Sioux City	1	------	0	0	0	3	0	0	0	5	0
Waterloo	0	------	------	0	------	5	0	------	0	0	------
Missouri:											
Kansas City	0	------	0	5	6	11	0	3	0	6	100
St. Joseph	0	------	0	0	2	1	0	1	0	0	24
St. Louis	3	------	0	48	6	35	0	9	0	37	186
North Dakota:											
Fargo	0	------	0	0	0	0	0	0	0	19	8
Grand Forks	0	------	------	0	------	0	0	------	0	11	------
Minot	0	------	0	1	0	0	0	0	0	0	------
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	0	------
Sioux Falls	0	------	0	0	0	0	0	0	0	0	9
Nebraska:											
Omaha	0	------	0	2	1	0	7	0	0	7	50
Kansas:											
Lawrence	0	------	0	0	0	1	0	0	0	2	5
Topeka	0	------	0	1	2	3	0	0	0	12	13
Wichita	0	------	0	8	2	2	0	2	0	14	37
Delaware:											
Wilmington	0	------	0	0	2	1	0	1	0	0	21
Maryland:											
Baltimore	4	------	0	66	11	6	0	15	1	81	184
Cumberland	0	------	0	0	1	1	0	0	0	13	14
Frederick	0	------	0	0	0	0	0	0	0	0	5
Dist. of Col.:											
Washington	7	------	0	43	7	9	0	16	3	13	157
Virginia:											
Lynchburg	0	------	0	3	0	0	0	1	0	9	7
Norfolk	0	------	------	11	2	0	0	0	0	3	26
Richmond	0	------	0	0	0	0	0	1	0	0	44
Roanoke	0	------	0	1	0	1	0	0	0	6	13
West Virginia:											
Charleston	0	------	0	0	2	0	0	1	0	4	28
Huntington	1	------	------	0	------	1	0	------	0	0	------
Wheeling	0	------	0	7	0	7	0	0	0	14	12
North Carolina:											
Gastonia	0	------	------	0	------	0	0	------	0	3	------
Raleigh	0	------	0	1	0	0	0	0	0	2	12
Wilmington	1	------	0	0	0	0	0	2	0	0	13
Winston-Salem	------	0	0	3	2	2	0	0	0	13	16
South Carolina:											
Charleston	0	------	0	2	1	1	0	1	1	2	22
Columbia	0	------	0	0	1	0	0	0	0	0	8
Florence	0	------	0	0	0	0	0	1	0	1	14
Greenville	0	------	0	0	1	0	0	0	0	4	5
Georgia:											
Atlanta	0	3	0	0	1	1	0	0	2	12	90
Brunswick	0	------	0	0	0	0	0	0	0	13	4
Savannah	0	2	0	0	3	0	0	1	0	0	28
Florida:											
Miami	0	1	0	0	1	0	0	3	1	0	31
Tampa	0	------	0	5	0	1	0	1	0	2	22
Kentucky:											
Ashland	1	------	------	123	------	1	0	------	2	19	------
Covington	0	1	1	10	1	0	0	0	0	11	11
Lexington	0	------	0	5	0	0	0	0	0	8	20
Louisville	0	3	1	40	6	6	0	3	0	48	86
Tennessee:											
Knoxville	0	------	0	0	1	1	0	0	1	5	28
Memphis	0	------	1	27	1	0	0	0	2	32	63
Nashville	0	------	0	2	3	0	0	4	0	13	51
Alabama:											
Birmingham	0	------	0	19	4	0	0	4	0	4	76
Mobile	0	------	0	0	1	0	0	1	0	0	26
Montgomery	0	------	------	0	------	0	0	------	0	0	------
Arkansas:											
Fort Smith	0	------	------	1	------	3	0	------	0	1	------
Little Rock	0	------	0	0	3	0	0	1	0	0	5

City reports for week ended June 26, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	0	0	0	4
New Orleans	9	2	1	1	11	4	0	7	2	26	141
Shreveport	0	------	0	0	3	0	0	3	3	0	50
Oklahoma:											
Muskogee	0	------	------	0	------	1	0	------	0	0	------
Oklahoma City	0	------	0	0	4	2	0	3	0	0	60
Tulsa	0	------	------	10	------	0	0	------	1	48	------
Texas:											
Dallas	1	------	0	12	2	2	0	2	0	16	73
Fort Worth	0	------	0	2	0	0	0	0	0	1	25
Galveston	0	------	0	0	0	0	0	0	0	0	9
Houston	3	------	0	0	4	2	0	6	0	1	94
San Antonio	0	------	0	0	4	0	0	13	0	7	82
Montana:											
Billings	0	------	0	0	1	0	0	0	0	0	2
Great Falls	0	------	0	0	1	2	1	0	0	4	9
Helena	0	------	0	1	0	0	0	0	0	3	3
Missoula	0	------	0	0	0	0	2	0	0	0	4
Idaho:											
Boise	0	------	0	1	1	0	0	0	0	0	6
Colorado:											
Colorado Springs	0	------	0	0	0	0	0	1	0	0	13
Denver	0	------	0	42	5	5	0	3	1	17	78
Pueblo	1	------	0	0	3	1	0	1	0	0	14
New Mexico:											
Albuquerque	0	------	0	1	1	1	0	1	0	2	10
Utah:											
Salt Lake City	0	------	0	61	1	7	0	0	0	23	22
Washington:											
Seattle	0	------	0	24	3	3	0	2	0	7	73
Spokane	0	------	0	31	1	1	0	0	0	22	19
Tacoma	0	------	0	0	0	2	0	2	0	3	24
Oregon:											
Portland	1	------	0	2	2	8	1	2	0	7	65
Salem	0	1	------	0	------	1	0	------	0	3	------
California:											
Los Angeles	5	3	2	5	16	18	0	22	1	90	207
Sacramento	3	------	0	10	1	1	0	3	1	12	23
San Francisco	1	3	0	24	5	7	0	7	0	62	148

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	2	0	0
Springfield	1	0	0
Rhode Island:			
Providence	1	0	0
New York:			
Buffalo	1	0	0
New York	4	0	2
Pennsylvania:			
Philadelphia	0	0	1
Ohio:			
Cincinnati	1	0	3
Cleveland	1	0	0
Indiana:			
Indianapolis	0	1	0
Illinois:			
Chicago	1	0	0
Wisconsin:			
Milwaukee	0	0	1
Missouri:			
St. Louis	1	0	0
Maryland:			
Baltimore	1	1	0

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
District of Columbia:			
Washington	1	0	0
Virginia:			
Norfolk	1	2	0
Georgia:			
Atlanta	0	0	1
Florida:			
Miami	1	0	1
Tennessee:			
Knoxville	1	0	0
Memphis	0	0	4
Nashville	0	0	2
Alabama:			
Birmingham	3	1	0
Louisiana:			
New Orleans	1	0	1
Texas:			
Houston	1	0	4
California:			
Los Angeles	2	4	0
San Francisco	0	0	1

Encephalitis, epidemic or lethargic.—Cases: New York, 4.
Pellagra.—Cases: Chicago, 1; Wichita, 1; Winston-Salem, 1; Charleston, S. C., 2; Atlanta, 1; Savannah, 4; Mobile, 1; New Orleans, 6; Los Angeles, 1.
Rabies in man.—Deaths: Los Angeles, 1.
Typhus fever.—Cases: Galveston, 1; Houston, 1. Deaths: Galveston, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended June 19, 1937.—During the 2 weeks ended June 19, 1937, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	4			2	2		1	1		10
Chicken pox		7	12	210	585	33	148	15	123	1, 133
Diphtheria	3	2	2	51	15	5	3	1		82
Dysentery				5	1					6
Erysipelas				6	3	4	2	2	1	18
Influenza	3	46		1					13	63
Measles		127	5	538	1, 523	232	196	233	278	3, 132
Mumps		4	14		346	4	1	9	68	446
Paratyphoid fever					1					1
Pneumonia	6				38		1		5	50
Poliomyelitis				7	1					8
Scarlet fever	1	27	2	161	268	29	45	123	41	697
Trachoma									1	1
Tuberculosis	4	20	25	159	140	24	24	3	38	437
Typhoid fever		1	5	30	3		2	2	1	44
Undulant fever				3	8					11
Whooping cough	1			316	246	166	8	11	16	764

CZECHOSLOVAKIA

Communicable diseases—April 1937.—During the month of April 1937, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	3		Poliomyelitis	3	1
Cerebrospinal meningitis	20	7	Puerperal fever	31	6
Chicken pox	225		Scarlet fever	1, 867	34
Diphtheria	1, 793	97	Trachoma	64	
Dysentery	13		Tularaemia	30	
Influenza	98	8	Typhoid fever	324	22
Malaria	373		Typhus fever	25	
Paratyphoid fever	10				

FINLAND

Communicable diseases—May 1937.—During the month of May 1937, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	227	Poliomyelitis	8
Dysentery	2	Scarlet fever	1, 235
Influenza	2, 586	Typhoid fever	30
Paratyphoid fever	22		

ITALY

Communicable diseases—4 weeks ended April 25, 1937.—During the 4 weeks ended April 25, 1937, cases of certain communicable diseases were reported in Italy as follows:

Disease	Mar. 29–Apr. 4		Apr. 5–11		Apr. 12–18		Apr. 19–25	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	4	4	7	7	12	12	8	6
Cerebrospinal meningitis	30	26	23	19	21	18	26	23
Chicken pox	483	162	470	177	381	147	479	172
Diphtheria	462	228	466	243	468	225	465	231
Dysentery	5	5	3	3	7	7	5	5
Hookworm disease	4	3	9	5	21	4	11	5
Lethargic encephalitis	2	2	4	4	3	3	1	1
Measles	2,076	323	1,868	345	1,786	338	1,640	337
Mumps	528	133	575	122	599	141	418	124
Paratyphoid fever	27	22	24	22	36	32	42	31
Poliomyelitis	25	23	17	12	19	18	24	22
Puerperal fever	37	32	37	36	30	30	28	26
Scarlet fever	312	128	382	130	395	125	336	118
Typhoid fever	200	147	198	129	224	143	224	149
Undulant fever	98	59	128	89	133	81	109	75
Whooping cough	416	155	655	207	597	187	519	160

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for June 25, 1937, pages 858–871. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued July 30, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

Straits Settlements—Penang.—During the week ended June 19, 1937, 1 case of cholera was reported in Penang, Straits Settlements.

Smallpox

Mexico.—During the month of March 1937, smallpox was reported in Mexico as follows: Mexico State, 1 case; Mexico, D. F., 16 cases, 4 deaths; Queretaro State, 3 cases.

Typhus Fever

Mexico.—During the month of March 1937, typhus fever has been reported in Mexico as follows: Aguascalientes, Aguascalientes State, 1 case; Guadalajara, Jalisco State, 1 death; Guanajuato, Guanajuato State, 2 cases, 1 death; Mexico State, 1 case, 1 death; Mexico, D. F., 12 cases, 6 deaths; Queretaro State, 1 case, 1 death; San Luis Potosi, San Luis Potosi State, 2 cases.

Yellow Fever

Gold Coast.—Yellow fever has been reported in Gold Coast as follows: June 24, 1937, Accra, 1 fatal case; Mepom, 1 fatal case. June 30, 1937, Adeiso, 1 fatal case; Huhunya, 1 fatal case; Swedru, 1 case.

Senegal—Bambey.—On June 25, 1937, 1 suspected case of yellow fever was reported in Bambey, Senegal.

X

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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SOME FACTORS WHICH AFFECT THE RELATIONSHIP BETWEEN HOUSING AND HEALTH

By J. M. DallaValle, *Passed Assistant Sanitary Engineer, U. S. Public Health Service*

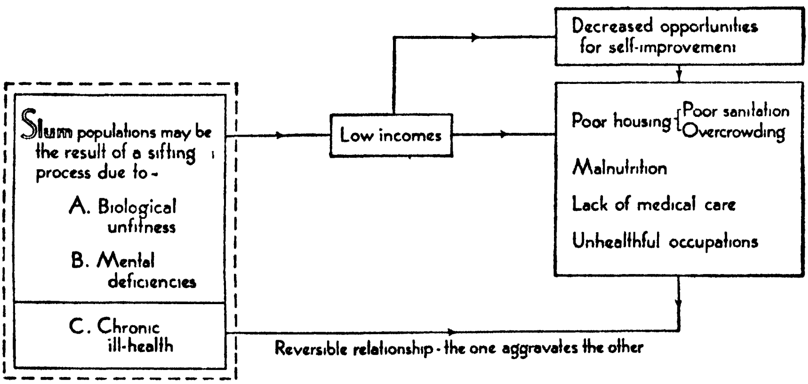
The reduction of sickness and mortality rates, the basic objective of all health organizations, is obviously related to sanitary and healthful environments. The accumulated evidence of the past few years tends to emphasize this fact, and in a large measure it has helped to accelerate the movement toward better housing in this country.

In discussing the relationship between housing and health, Britten (*1*) has pointed out that the coexistence of a low level of public health and bad housing conditions does not necessarily prove that the one is caused by the other. Causal relationships must be traced through specific factors easily identified as having a bearing upon health. These, as Britten has stated, include impure water supply, insanitary toilets, lack of sewer connections, overcrowding, inadequate lighting, poor ventilation, lack of heat, excessive dampness, dilapidation, and faulty screening against flies and mosquitoes. Even a consideration of these factors, however, does not always lead to a direct quantitative expression of the relationship between housing and health. The relationship is exceedingly complicated by many other factors which require that the data be subjected to close scrutiny and be used with great caution. Fortunately, the evidence accumulated during the past few years, even though spurious in many instances, is sufficiently conclusive in proving that health and housing are intimately related. It is the purpose of this paper to amplify the fundamental causal relationships between housing and health which have been given by Britten and to stress other considerations which are influencing factors. In addition, the activities of health departments with regard to housing are discussed.

The evidence which associates ill health with poor housing is based on numerous factors. The accompanying figure illustrates an attempt to coordinate several of the more important considerations. The arrangement shown in the figure is based on the fact that low incomes are responsible (1) for decreased opportunities for self-improvement, and (2) for environmental conditions in which low-income groups live. On the other hand, low incomes may be due in

part to fundamental weaknesses in the general population. The assumption made in this case is that there is a constant sifting action in the general population which tends to reduce to a low economic status those who cannot meet the forces of competitive existence. In this respect, technological progress has been such during recent years that it has imposed demands for increased abilities on the part of everyone. Technicological considerations are some of the causes for the inertia and inadaptability of many workers which prevent their adjustment to changing conditions.

The observation that slum populations are constituted of families with low income, engaged in pursuits which offer no advancement or are in themselves subject to frequent changes and lay-offs, would seem to demonstrate a de facto segregation of these groups.



Interrelationship of some important conditions regarding housing and health.

In discussing the effect of the sifting process with relation to sickness and income during the depression, Perrott and Collins (*2*) stated:

> * * * the men who kept their jobs during the depression were, on the average, the more vigorous, capable, and intelligent ones. Moreover, with many exceptions, those who lost their jobs were less efficient than those who remained employed. This inefficiency may have been exhibited in many ways distinct from inability to compete in the economic struggle—perhaps a diathesis or tendency toward sickliness existed among these families as a concomitant of the economic efficiency of the wage earner.

These remarks, while limited to the effects of change in income during the depression, nevertheless reveal a characteristic of slum wage earners. It may well be that ill health persists in slums not for economic or sanitary reaons only, but rather because slum populations are comprised of persons who have a tendency toward sickliness.

The sifting action previously mentioned may be said to be due to certain deficiencies lacking in the general population. These are (A) a biological unfitness—that is, unfitness arising from physical handicaps such as poor eyesight—which withholds many from under-

taking high speed precision work required in some industries; (B) mental or educational deficiencies; and (C) chronic ill health. These three factors contribute both to low incomes and to the associated environment. In turn, these factors accentuate the sifting process which, unless continually checked by aid from governmental and private sources, would reduce many families to a lower status than that in which they exist at the present time.

Because of the intricate nature of the problem, the following paragraphs are chiefly concerned with a discussion of the factors intimately associated with the housing problem, namely, (1) the causal factors (sanitation and overcrowding) cited by Britten, (2) malnutrition, (3) lack of medical care, and (4) unhealthful occupations.

CAUSAL FACTORS

Lack of sanitary facilities.—In both urban and rural housing, inadequate sanitary facilities foster the spread of disease. By inadequate sanitary facilities are meant all the items which affect the provision and maintenance of sanitary and hygienic conditions. One of these items common to slums and blighted areas is improper plumbing, which may constitute an added hazard with reference to epidemic disease. Amoebic dysentery and typhoid fever have been traced to cross-connections or syphonage of sewage into the water supply. Faulty plumbing is a potential risk which the community as a whole cannot afford. Drinking water contaminated as a result of faults in plumbing is not only a factor in the spread of disease in slum areas but is a risk to the whole community whose members may unwittingly come into contact with persons infected by such sources.

Associated with faulty plumbing in congested areas is the lack of sewer connections. An interesting result with regard to the absence of adequate toilet facilities is illustrated by a recent study of two slum areas, in one of which approximately 56 percent and in the other 92 percent of the houses were without private toilets (*3*). The study revealed, among other things, that the typhoid case rate in the first instance was 39 per 100,000 and in the other 52 per 100,000, an excess of 13 cases per 100,000 in the group having fewer private toilets. The use of a single toilet or privy for several families must be considered a definite menace to health. As in the case of faulty plumbing, not only do such conditions affect the blighted area where they are found, but also the immediate neighborhood, through the transmission of disease by flies and other insects.

Poor housing has other notable defects than lack of safe water supplies and sewage-disposal facilities. Structural considerations are equally important and have a bearing upon health. Thus, dilapidated or poorly maintained dwellings may lead to rat infestations. Dilapidation and a lack of window screening, especially in southern

communities, are also partly responsible for the spread of malaria. This fact can be deduced from the data collected by Moon (*4*), which is presented in the accompanying table.

Community	Percentage of blood specimens positive for malaria parasites		
	1928	1929	1930
	Percent	*Percent*	*Percent*
A	40	32.8	15.8
B	18	9.8	4.3
C	15	9.7	10.5

The data presented in the table indicate the effect of extended screening programs in Lake County, Tenn., during the period 1927–30, and are based on the number of blood specimens taken from residents in the county which were positive for malaria parasites. The significance of these data with respect to unscreened dwellings in slums and blighted areas where malaria is endemic is apparent.[1] Furthermore, the lack of screens also offers some danger in spreading diarrheal diseases by permitting access to flies carrying infection from privies and other sources of pollution.

Another characteristic of slum dwellings is the insufficiency of natural lighting. Lack of sunlight is considered one of the factors causing rickets. For example, Heydecker found in Detroit that the average amount of light within rooms in which rickets occurred was less than one-half of 1 percent of the outside daylight intensity at the same time, whereas studies of numerous other rooms of the same kind in which an excess of the average illumination was found, revealed an absence of rickets (*5*).[2] A similar finding was noted earlier by Ferguson (*6*) and by Dick (*7*). In addition to these conclusions with respect to rickets, slums frequently do not permit children to receive a sufficient amount of outdoor sunshine and exercise. Such areas are generally associated with a lack of playgrounds, narrow streets, and tall buildings which reduce essential factors in the normal development of the child.

Finally, the lack of ventilation and heat and the presence of excessive dampness must also have a part in promoting ill health. Lack of ventilation is thought to have some relation to the incidence of tuberculosis, while dampness and the lack of heat are believed to be associated with pneumonia, rheumatic attacks, and other diseases.

Overcrowding.—Overcrowding constitutes the second important causal factor affecting the relation between housing and health. Con-

[1] The severe drought of 1930 may have influenced the data given in the last column. The downward trend in 1929 is, however, significant.

[2] These conclusions (implied or otherwise) of the investigators cited are open to serious criticism, since it is assumed that a relation exists between illumination and antirachitic radiation. This may not necessarily be the case.

gestion is due to a number of conditions, some of which cannot be said to be limited to slums alone, but which, none the less, are associated with them. They are (1) low incomes, which compel families to double up in order to pay rents, (2) the tendency toward large families among slum tenants, (3) lengthening of the life span, which, in turn, has increased the number of families requiring dwellings, and (4) the inability to secure quarters which fit the size of the family. Depression years also aggravate already congested conditions; but, as will be discussed later, they apparently do not materially affect the incidence of sickness in slum areas.

Congested dwellings create a maximum opportunity for the spread of disease. It follows, therefore, that if the lack of sanitary facilities is one of the primary causes of disease, then overcrowding is the vehicle by which it is spread. This is particularly true of the contagious diseases and especially the diseases of childhood. Overcrowding permits numerous contacts to be made with infected persons, and these contacts conduce to increase the incidence of disease, which may often reach epidemic proportions. The influence of overcrowding on the spread of such infectious diseases as measles, whooping cough, tuberculosis, cerebrospinal fever, and similar diseases, cannot be overestimated.

Congestion and health are not always susceptible of quantitative measurements. While other causal factors, such as economic and social status, may have a bearing upon the incidence of disease, nevertheless, the evidence is unmistakable that congestion assists in its spread. This is illustrated in an analysis of figures based on the results of a study of disease and mortality rates during 10 months in 1920 in Detroit (*8*). The results of this study indicated that tuberculosis in districts with more than one person per room is from two to three times greater than in districts with 0.6 person per room. Overcrowding was also directly related to high infant mortality. Where more than one person per room was found, the infant mortality was more than 50 percent greater than in the area with 0.6 person per room. Likewise, it was noted that influenza and pneumonia in the months of January and February 1920 played the greatest havoc in crowded areas. Infant mortality, as an index of overcrowding, has been verified in the recent study of housing problems by Graves and Fletcher (*3*) and the U. S. Children's Bureau (*9*). The latter investigation showed that, when the factors of activity and earnings were eliminated, there was in every case a higher mortality rate in the more congested quarters.

MALNUTRITION

The second important factor contributing to ill health in slums and blighted areas is malnutrition. The investigations of poverty, nutrition, and growth by Paton and Findlay (*10*) are revealing. These

investigations indicate that, although by far the largest portion of the income received by slum tenants is spent for food, slum children were generally lower in weight than children who lived in better circumstances. Nutritional factors also appeared to be modified by impaired digestion, amount of sleep, and the lack of essential vitamins. Paton and Findlay also point out that an increased income among slum tenants is not expended toward better nutrition, but rather for luxuries.

Palmer's study (*11*) of height and weight among the depression poor is likewise significant. This study indicated that no great change in relative weights occurred in children in the low-income groups which maintained the same status prior to and during the depression, but that children who were in comfortable circumstances prior to the depression and were subsequently made poor failed by approximately 2 percent to attain the weight of children in the group as a whole. That children whose families were subjected to the violent economic changes during the depression must have been deprived of proper food cannot be denied; and since their relative weights tended to approximate those of the perpetually poor, it must be concluded that nutrition has an important bearing upon physical characteristics and ability to resist illness.

LACK OF MEDICAL CARE

The lack of medical care may be considered as the third important factor affecting the relation between housing and health. Private medical attention is not generally available to slum families. It is both probable and possible that the type of medical care received by slum populations colors all data which have thus far been collected and published. In fact, it is one of the complicating factors which prohibits a clear-cut analysis of any interrelated condition of housing and health.

The medical needs of a slum community may be supplied by municipal public health and welfare departments or by private charities. However, medical care for slum tenants is often limited by such factors as infrequency of visits, failures of families to report illnesses until they have reached serious proportions, or ignorance of the facilities available.

In passing, it may be remarked that the housing problem cannot be dissociated from public health. Better housing may diminish the causal factors of disease, but so long as medical care is inadequate, morbidity and mortality rates for people with low incomes will continue to be above the average for the general population. For example, an index of poor housing as sensitive as infant mortality is directly affected by the supply or lack of medical care. The availability of prenatal and postnatal attention must, in this instance, be

regarded as one of the most effective methods of reducing the infant mortality rate. The case of tuberculosis is similar. The essential causal factors are contact through overcrowding and insanitary conditions. Nevertheless, tuberculosis continues to be a public health problem even in communities with excellent housing facilities. Constant medical care and education are necessary in order to prevent the spread of disease. The type of medical care provided in the past and to be provided in the future is an essential consideration for a rational approach to a solution of the factors affecting the relation between housing and health.

INFLUENCE OF THE OCCUPATIONAL ENVIRONMENT

The low-income factor which compels families to live in over crowded slum areas, also compels them to seek types of employment which are not generally healthful. The industrial or other working environment must consequently play an important role. When it is considered that the life of the average industrial worker is from 5 to 7 years shorter than that of persons engaged in the more comfortable pursuits of life, it must be clear that investigations of housing and health cannot ignore the factor of occupation (*12*). Steel and foundry workers, for example, have a pneumonia rate which is more than twice that of the normal population. Similarly, slum studies in mining communities must consider that tuberculosis is exceedingly high among miners, and that such occupations are as important causal factors as insanitary facilities. There are many occupations in which slum inhabitants are engaged and which contribute to increased illness; foundry work, mining operations, stone cutting, exposure to lead and other chemicals, and "sweatshops" are but a few which raise the incidence of disease and death.

Aggravating the above condition is also the fact that efforts to increase income force upon slum families the necessity of sending children to seek employment when their proper mental and physical development require more normal activities.

SUGGESTED HOUSING PROBLEMS

While the factors pertaining to housing and health have as yet to be determined with a high degree of definiteness, it need not be concluded that better housing must await the establishment of quantitative relationships. Housing and public health are intimately associated; good housing conditions mean a better public health; and poor housing implies a low level of physical well being. The menace of slums and blighted areas is not restricted to the immediate residents but to the public at large. Nor must it be forgotten that moneys expended for the care of slum residents, without first improving their

environment, constitute a perennial burden with no assurance that the constant potential risk of epidemics has been eradicated from the community. In the long run, adequate housing implies a moral obligation on the part of any government interested in the welfare of its citizens.

The five studies outlined below are in part being undertaken by the Public Health Service. It will be noted that these studies are broad in scope and emphasize the basic factors presented earlier in this paper. Stress is placed upon a knowledge of the characteristics of slum populations on one hand, and in developing suitable yardsticks for determining housing and health relationships on the other.

1. *How much does poor housing contribute to the cost of public health administration?*—This is a rather sordid approach to the housing problem. However, it may prove revealing and give necessary impetus to the housing movement. Funds which are spent yearly in checking disease might with greater advantage be spent in eliminating the causes.

A study of this question may also yield morbidity and mortality data according to economic status and housing conditions. The complete tabulations now being made on the Chronic Disease Survey and Health Facilities Survey [3] may afford some indication of the type of relationships to be expected.

2. *Studies among poorly housed groups with a view to determining the effect of environment on health.*—A suitable method for evaluating the effect of housing on health is difficult to formulate. It has been customary to use such criteria as malnutrition, incidence of tuberculosis, or infant mortality for this purpose. These criteria, however, do not yield an integrated effect of housing conditions upon slum dwellers. It is believed that an index such as the rate of growth of children would be more suitable. This index would take into account physical factors in the household such as lack of natural illumination, dampness, and poor sanitation.

3. *Repeating the depression studies of Perrott and Collins to check their theory of sifting forces in the general population now that economic rehabilitation is taking place.*—This would be a restudy of the population investigated in the original survey in order to test the hypothesis propounded.

4. *Studies of industrial housing.*—These studies are now being considered in the Division of Industrial Hygiene, particularly with regard to investigating how much home environment may contribute to morbidity and mortality among industrial workers.

[3] These studies are part of the National Health Inventory undertaken by the Public Health Service. They comprise surveys made in 95 cities and 22 rural counties in 19 States The Chronic Disease Survey includes data on chronic diseases in relation to income, environment, and other factors among 865,000 families (about 3,500,000 individuals).

5. *Uniform municipal health and sanitation ordinances.*—In connection with housing surveys, measures of sanitary facilities, overcrowding, and medical care are essential. The terms "excellent", "good", "fair", or "bad" furnish no specific connotation of conditions unless they are first defined. In survey work it is desirable to class a given condition as surpassing, equalling, or falling short of a given criterion. Unfortunately, in this country there are no uniform sanitary standards. They are fixed by State laws, local ordinances, or by opinions of local boards of health. These differences, added to arbitrary standards often imposed by investigators in the analysis of collected data, have resulted in much confusion.

Some effort should be devoted to standardizing sanitary requirements for new housing. Uniform standards for the country as a whole, giving particular attention to minimum sanitary requirements and overcrowding, would undoubtedly accelerate the movement in building low-cost, low-rent homes. With regard to sanitary requirements, the Housing Act of 1935 for England surpasses anything which has been attempted in the United States. This act not only defines overcrowding, but empowers local authorities to define areas unfit for human habitation and requiring redevelopment or reconditioning. The recognition of the public health aspects of housing, as set forth in this act, indicates a conviction that housing and health are inseparable. This being the case, it devolves upon public health authorities to promulgate criteria by which dwellings in slums or blighted areas can be determined as unfit or detrimental to the public welfare. A similar procedure in this country would prove of inestimable value. Yet, here again, it must be emphasized that housing movements should not wait upon the development of sanitary standards.

HOUSING AND PUBLIC HEALTH ACTIVITIES

Functions of health departments.—Public health organizations perform three important duties with regard to housing matters: (1) By observing epidemiological trends they are enabled to focus attention on sources of disease; (2) they are constantly engaged in survey and inspection activities; and (3) they are frequently called upon to provide medical care for the indigent poor. The first duty is concerned with the reporting of diseases, preventing their spread, and tracing the factors of causation.

The second function relates to survey and inspection activities. Health surveys are usually made at periodic intervals for the purpose of checking upon the welfare of various communities and for research into the causes of illnesses. Inspections locate potential hazards to health and, through the enforcement of laws and ordinances, seek to remedy them. Finally, health departments furnish medical

care to families of the very poor. This function will undoubtedly persist even after better housing has been provided. Slum clearance, redevelopment, or reconditioning, as has been pointed out, may reduce the causal factors of disease; but families with low incomes will probably continue to require medical care if lower morbidity and mortality in a community are the objectives of public health organizations.

The importance of the public health aspect of the housing problem is recognized in legislation introduced both here and abroad. For example, the British Housing Acts are enforced by the National Ministry of Health. In this country, recent legislation creating a separate Housing Authority in the Department of the Interior contains the statement that "* * * slums, blighted areas, or unsafe, insanitary or overcrowded dwellings, or a combination of these conditions * * * are inimical to the general welfare of the Nation by encouraging the spread of disease and lowering the level of health, morale, and vitality of large portions of the American people." The fundamental health aspect of the housing problem is thus realized by the lawmakers of the country. It will be incumbent upon health administrators to determine on the bases of local conditions what constitutes conditions inimical to the health of residents and to the community.

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AGE OF GAINFUL WHITE AND NEGRO MALE WORKERS OF THE UNITED STATES, 1920 AND 1930[1]

Studies on the Age of Gainful Workers No. 4

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INTRODUCTION

The first paper of the series (*1–3*) dealt with the age of gainful male and female workers of the United States by occupational group for the census years 1920 and 1930, no differentiation being made with respect to the color of the workers. The percentage age distribution for each occupational group, specific for sex and census year, was compared with the percentage age distribution of all gainful workers by forming the ratios of corresponding percentages. This ratio of an observed percentage to its corresponding defined normal percentage gave an indication of whether there was an excess or dearth of workers in any particular age and occupational group. In the instance of the males it was found, among other things, that the child group, 10 to 17 years, had excesses of workers in agriculture, forestry and animal husbandry, and in the clerical occupations; that the middle-aged group, 45 to 64 years, had a dearth principally in the clerical occupations; and that the old-aged group, 65 years and over, had a dearth in extraction of minerals, manufacturing and mechanical industries, transportation and communication, trade, and the clerical occupations, with notable excesses in public service and in agriculture, forestry and animal husbandry. These observations held for both census years.

It is conceivable that the ratios for the white and for the Negro workers may show noteworthy differences. It is the purpose of the present paper, therefore, to investigate the age composition of gainful white and Negro male workers, and, in the paper immediately to follow, the same matter with respect to the females.

The term *gainful worker* is defined by the Bureau of the Census thus: "* * * all persons 10 years old and over who usually follow a gainful occupation even though they may not have been actually employed at the time the census was taken. It does not include women doing housework in their own homes without wages and having no other employment, nor children working at home, merely on general household work, on chores, or at odd times on other work" (*4*).

The present inquiry, like the previous ones, makes use of basic data published by the Bureau of the Census in its reports of 1920 and 1930.

[1] From the Division of Industrial Hygiene, National Institute of Health, U. S. Public Health Service, Washington, D. C.

WORKERS IN DIFFERENT OCCUPATIONAL GROUPS

The white and Negro male workers of 1920 and 1930, respectively, are shown distributed among nine important occupational groups in table 1. In 1920 there were approximately 30 million white male workers and 3 million Negroes; in 1930 the figures for both races showed an increase of about 13 percent. In both races the largest increase occurred in professional service, 78 percent for the Negroes and 52 percent for the white workers. Second and third places with

TABLE 1.—*Gainful white and Negro male workers in the United States, 10 years of age and over, specific for occupational group, 1920 and 1930*

Occupational group	1920		1930	
	White	Negro	White	Negro
	Number		Number	
All groups	29,653,677	3,252,862	33,766,933	3,662,893
Agriculture, forestry, animal husbandry	8,230,805	1,566,627	8,010,260	1,524,207
Extraction of minerals	1,012,560	72,892	889,696	74,919
Manufacturing and mechanical industries	10,087,911	781,827	11,164,291	923,586
Transportation and communication	2,533,746	308,896	3,086,449	395,437
Trade	3,432,790	129,309	4,907,600	160,241
Public service (n. e. c.)[1]	696,934	49,586	782,769	49,273
Professional service	1,083,988	41,056	1,644,460	72,898
Domestic and personal service	905,166	273,959	1,279,215	423,645
Clerical occupations	1,669,777	28,710	2,002,163	29,687
	Percent		Percent	
All groups	100.0	100.0	100.0	100.0
Agriculture, forestry, animal husbandry	27.8	48.2	23.7	41.6
Extraction of minerals	3.4	2.2	2.6	2.1
Manufacturing and mechanical industries	34.0	24.0	33.1	25.2
Transportation and communication	8.5	9.5	9.2	10.8
Trade	11.6	4.0	14.5	4.6
Public service (n. e. c.)[1]	2.4	1.5	2.3	1.3
Professional service	3.7	1.3	4.9	2.0
Domestic and personal service	3.0	8.4	3.8	11.6
Clerical occupations	5.6	.9	5.9	.8

[1] N. e. c.=Not elsewhere classified.

respect to increases were held in both races by trade, and domestic and personal service. Both races showed a decrease of nearly 3 percent in agriculture, forestry, and animal husbandry. Public service showed a slight decrease for the Negroes, and extraction of minerals a decrease of 12 percent for the white workers. The following percentages calculated from table 1 refer to the increases or decreases in the number of workers in each occupational group during the 10-year period:

Occupational group	Percentage increase or decrease, 1920 to 1930	
	White	Negro
All groups	+13 9	+12.6
Agriculture, forestry, animal husbandry	−2 7	−2 7
Extraction of minerals	−12.1	+2.8
Manufacturing and mechanical industries	+10 7	+18.1
Transportation and communication	+21 8	+28.0
Trade	+43 0	+30.9
Public service (not elsewhere classified)	+12 3	− 6
Professional service	+51 7	+77 6
Domestic and personal service	+41 3	+54 6
Clerical occupations	+19 9	+3 4

When the percentages of males in each occupational group, specific for color and census year, as shown in table 1, are arranged in decreasing order of magnitude, the manufacturing and mechanical industries and agriculture, forestry, and animal husbandry occupy the leading places in both years and for both colors. In each census year the agricultural group contained almost one-half of the Negro workers and the manufacturing and mechanical industries about one-fourth. The white workers, on the other hand, were represented in both census years by about one-third of their workers in the manufacturing and mechanical industries, and by approximately one-fourth in the agricultural group. In the instance of the white workers, public service ranked lowest with about 2 percent, while the clerical occupations ranked lowest among the Negroes with less than 1 percent: these observations hold for both census years. The most striking changes that the 10 years have wrought probably occurred among the Negroes in the agricultural group and in domestic and personal service; in the former there was a reduction from 48 to 42 percent, and in the latter an increase from 8 to 12 percent.

WORKERS IN DIFFERENT OCCUPATIONAL GROUPS BY AGE

The age distribution of the white and Negro male workers of 1920 and 1930 according to occupational group is shown in table 2. It will be observed that, regardless of occupation, the order of importance of the age groups of the white and Negro workers, respectively, is similar for both years. With respect to the white workers of both years, almost one-half appears in the age group 25–44 years, over one-fourth in the middle-aged group 45–64, and almost one-eighth in the age group 20–24; the remaining age groups are each represented by between 3 and 6 percent of the workers. It is noteworthy that during the 10 years there was a reduction in the percentage of child workers and a slight increase in the percentage of the old-aged group. With respect to the Negro workers, the order of importance of the age groups is the same in both years, and, with the exception of the child

TABLE 2.—*Age distribution of gainful white and Negro male workers in the United States, specific for occupational group, 1920 and 1930*

Occupational group	Age group, 1920: 10 years old and over	10–17	18–19	20–24	25–44 [1]	45–64	65 and over	Age group, 1930: 10 years old and over	10–17	18–19	20–24	25–44 [1]	45–64	65 and over
	Number	Percent						Number	Percent					
	White							White						
All groups	29,653,677	4 994	4 276	12 309	47 777	26 103	4 541	33,766,933	3.248	4 073	12 361	46 901	28.142	5 270
Agriculture, forestry, animal husbandry	8,230,805	7 330	4 464	11 339	41 335	28 669	6 863	8,010.260	6 677	5 256	11 709	37 109	30 678	8.571
Extraction of minerals	1,012 760	4 634	4 928	12 997	53 578	21 777	2.036	889.696	1.992	4 176	13 151	50 904	27 165	2 612
Manufacturing and mechanical industries	10 087 911	4 303	4 304	12 544	50 354	24 958	3 537	11,164,291	2 140	3 940	12.529	49 283	27 939	4 109
Transportation and communication	2,533,746	2 597	4 126	13 884	53 025	23 595	2 773	3.036,449	1 571	3 250	13 322	53 287	25 571	2 999
Trade	3,432,790	3 491	2 847	10 317	50 503	28 743	4 099	4,907,600	2 476	2 980	10 568	50.782	28 583	4 611
Public service (n. e c.) [2]	696,934	1 530	6 910	14 991	40 883	29 159	6 524	782,769	504	2.522	10 167	45 105	33 193	8 509
Professional service	1,083,988	.679	1 594	9 599	54 095	28 823	5 205	1,644.460	957	1 907	10 999	52 603	28 316	5 218
Domestic and personal service	905.166	2 708	2 200	8 103	49 679	31 184	6 126	1,279 245	2.110	3 010	9 371	46 648	31 928	6.933
Clerical occupations	1,669,777	10 092	7.722	19 877	44 616	15 564	2.129	2,002,163	4 420	7.123	20 492	47.845	17.567	2.553
	Negro							Negro						
All groups	3,252,862	10 220	5 263	13 997	42 638	23 594	4.288	3,662,893	8.188	5.210	14 134	44.772	23 829	3 867
Agriculture, forestry, animal husbandry	1,566,627	15 922	5 604	12 399	34 292	25 820	5 963	1,524,207	15 017	6 619	13 642	32.674	26.193	5.855
Extraction of minerals	72.892	4 127	5 586	16 670	51 178	20 872	1 567	74,919	2.013	3.809	13.432	57.245	22.021	1.490
Manufacturing and mechanical industries	781.827	4 621	5 194	16 372	50 264	20 863	2 686	923.536	2 927	4 094	14.463	54 060	22 092	2.364
Transportation and communication	308 896	3 455	4 906	16 699	52 855	19 997	1 998	395,437	1 870	3 653	15.791	58.143	19 106	1 437
Trade	129 309	6 867	4 840	13 304	49 233	23 125	2 631	169,241	8 634	6 163	14.521	46.429	21 686	2.547
Public service (n e. c.) [2]	49 556	2.501	5 225	19 699	47 302	21 423	3.850	49,273	1 368	2 354	10 827	52 463	28 852	4.136
Professional service	41.056	943	1 215	5 753	48 344	38 659	5 036	72,898	3 641	2.964	9.513	45,560	33 331	4.991
Domestic and personal service	273,959	5 605	4 460	13 222	50 294	22.770	3 646	423,645	3.653	4 645	14 872	51.059	22.646	3.125
Clerical occupations	28,710	25.528	6.047	13 145	39 812	14 235	1.233	29,687	5.474	4.733	12.894	53.636	21.356	1.907

[1] Includes a negligible number of persons of unknown age.
[2] N. e. c.=Not elsewhere classified.

group, the percentages for both years are similar to the corresponding ones for the white workers. In both races the passage of 10 years effected decreases in the percentages of child workers, but the magnitude of these percentages for the Negroes of both years is considerably greater than that of the corresponding percentages for the white workers. Thus, for the white workers the decrease was from 5 to 3 percent, while for the Negroes the change was from 10 to 8 percent.

It is now pertinent to examine the age distribution of the workers in the different occupational groups. Particular attention will be directed to the contribution of each occupational group to the child, middle- and old-aged categories, respectively.

Further reference to table 2 discloses that the white child group of 1920 in clerical occupations was 10 percent of the total number of white workers so engaged. No other occupational group furnished a corresponding percentage so large; in fact the remaining occupational groups showed percentages less than 8 percent. The Negro child group for the same year showed a percentage in clerical occupations over two and one-half times as great as that for the white boys, and, as in the instance of the white workers, this particular occupational group ranked first. Only one other occupational group yielded a relatively high percentage, namely, agriculture, forestry, and animal husbandry (16 percent); the remaining groups were all less than 7 percent. In 1930 the clerical occupations showed reduced percentages, particularly the percentage for the Negroes. Indeed all of the occupational groups of the child group, with the exception of professional service and trade (Negroes only), showed decreases. In the instance of the white children, all occupational groups of 1930 yielded percentages less than 7 percent; in the corresponding Negro group, agriculture, forestry, and animal husbandry ranked first with 15 percent, followed by trade with 9 percent.

The year 1920 showed the percentages for the various occupational groups among the middle-aged white workers to fluctuate from 16 to 31 percent; the corresponding range among the Negro workers was 14 to 39. The minimum percentage of each range was given by the clerical occupations, and the highest by domestic and personal service among the white workers, and by professional service among the Negroes. In 1920 over 60 percent of the middle-aged white workers were in domestic and personal service and public service, and over 64 percent of the middle-aged Negro workers were in professional service and agriculture, forestry, and animal husbandry. In general, the lapse of 10 years effected increases in the percentages of both races; a decrease, however, occurred among the Negroes in professional service, the percentage changing from 39 to 33 percent.

With respect to the old-aged group, 65 years and over, the percentages, regardless of race, were all less than 7 percent in 1920. In

1930 all of the occupational groups showed increases among the white workers, noteworthy among which were agriculture, forestry, and animal husbandry, and public service, each 7 to 9 percent. Among the Negro workers the percentages generally decreased, the exceptions being slight increases in public service and the clerical occupations.

RATIO OF OBSERVED PERCENTAGE OF WORKERS IN EACH OCCUPATIONAL GROUP TO THE EXPECTED OR NORMAL PERCENTAGE

Of considerable interest is the question of whether the observed percentage of workers in a specific occupational and age group is relatively small, normal, or large. It may be assumed that the percentage age distribution of the workers regardless of occupation but specific for color and census year is the "expected" or "normal" percentage age distribution for each occupational group of the corresponding color and census year. The ratio of an observed percentage to its corresponding normal percentage would indicate, when less than one, a dearth of workers; when equal to one, a normal percentage of workers, and when greater than one, an excess of workers. The percentages constituting the four normal age distributions as defined, together with the observed percentages, specific for age, color, and census year, are given in table 2.

Reference to the normal age distributions has already been made in the previous section. The calculated ratios are shown in table 3, and figure 1 presents them graphically. The two broken lines in the figure drawn through 1.00 indicate that the observed percentage is identical with the normal percentage—in other words, that there is neither a dearth nor an excess of workers. The bars below or above a broken line indicate not only the presence of a dearth or an excess but also the magnitude of such dearth or excess. The interpretation of a ratio may be clarified by citing an example. Thus the white workers of 1930, aged 10–17 years, in agriculture, forestry, and animal husbandry constituted 6.7 percent of the total so engaged. Furthermore, the percentage of all white workers of 1930 in the age group 10–17, regardless of occupation, however, was 3.2 percent. It follows that the ratio of the two percentages is approximately two, which means that twice as many workers were observed as were expected, or an excess of 100 percent. In round numbers, 270,000 workers were expected while 540,000 were observed.

Variability of the ratios in the different age groups.—Figure 1 reveals striking differences in the variability of the ratios in the various age groups. A study of table 3 shows that the most stable age group among the white workers in each census year is 25–44, followed by 45–64, 20–24, 65 and over, 18–19, and 10–17. The minimum and maximum values of the ratios for the age group 25–44 for 1920 are 0.86 (public service) and 1.11 (transportation and communication);

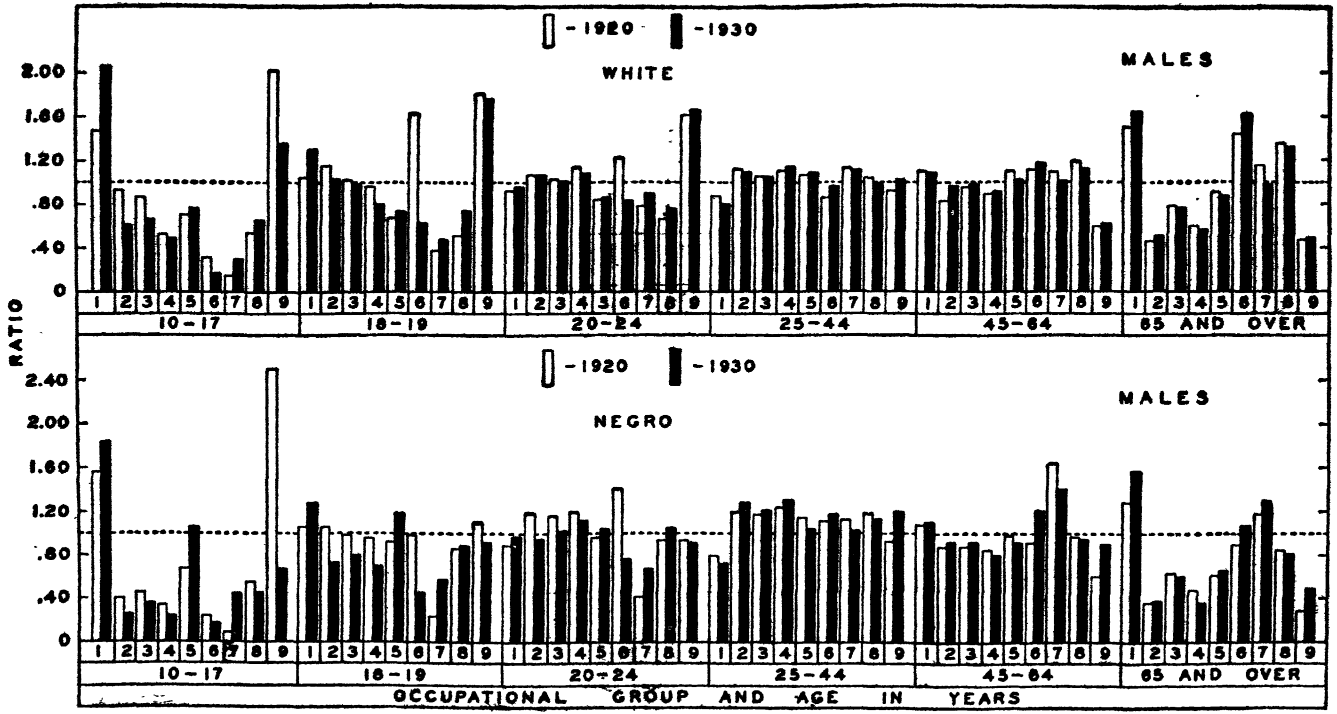

FIGURE 1.—Age-specific ratios of the percentages of gainful white and Negro male workers in different occupational groups to the percentages of all groups, 1920 and 1930. The numbers 1-9 are defined thus: 1, agriculture, forestry, and animal husbandry; 2, extraction of minerals; 3, manufacturing and mechanical industries; 4, transportation and communication; 5, trade; 6, public service (not elsewhere classified); 7, professional service; 8, domestic and personal service; and 9, clerical occupations.

the corresponding ratios for 1930 are 0.79 (agriculture, forestry, and animal husbandry) and 1.14 (transportation and communication). The age group 10–17, on the other hand, varies in 1920 from 0.14 (professional service) to 2.02 (clerical occupations); the corresponding ratios for 1930 are 0.16 (public service) and 2.06 (agriculture, forestry, and animal husbandry). The lowest minimum ratio occurring among the white workers is 0.14 (age group 10–17, professional service, 1920); the highest maximum is 2.06 (age group 10–17, agriculture, 1930).

TABLE 3.—*Ratio by age and color of percentage of gainful male workers in a specified occupational group to the percentage for all groups, 1920 and 1930 (percentages shown in table 2)*

Occupational group	Age group, 1920						Age group, 1930					
	10–17	18–19	20–24	25–44	45–64	65 and over	10–17	18–19	20–24	25–44	45–64	65 and over
	White						White					
Agriculture, forestry, animal husbandry	1.47	1 04	0 92	0 87	1.10	1.51	2.06	1 29	0 95	0 79	1.09	1 63
Extraction of minerals	.93	1.15	1.06	1 12	.83	.46	61	1.02	1 06	1.09	.97	.50
Manufacturing and mechanical industries	.86	1.01	1 02	1 05	.96	.78	.66	.97	1 01	1 05	99	.78
Transportation and communication	.52	.96	1.13	1.11	.90	.61	.48	.80	1.08	1.14	.91	.57
Trade	.70	67	.84	1 06	1.10	.90	.76	.73	.85	1.08	1 02	.87
Public service (n. e. c.) [1]	.31	1.62	1 22	.86	1.12	1 44	.16	.62	.82	96	1.18	1 61
Professional service	.14	37	.78	1.13	1 10	1.15	.29	.47	.89	1.12	1.01	.99
Domestic and personal service	.54	.51	.66	1.04	1.19	1.35	65	.74	.76	99	1.13	1.32
Clerical occupations	2.02	1.81	1.61	.93	.60	.47	1.36	1.75	1.66	1.02	.62	.48
	Negro						Negro					
Agriculture, forestry, animal husbandry	1.56	1.06	0.89	0 80	1.09	1.39	1 83	1.27	0 97	0.73	1 10	1.51
Extraction of minerals	.40	1.06	1.19	1.20	.88	.37	.25	.73	.95	1 28	.92	.38
Manufacturing and mechanical industries	.45	.99	1.17	1.18	.88	.63	.36	.79	1.02	1.21	.93	.61
Transportation and communication	.34	.95	1.19	1.24	.85	.47	.23	.70	1 12	1 30	.80	.37
Trade	.67	.92	95	1 15	.98	.61	1.06	1.18	1.03	1.04	.91	.66
Public service (n. e. c.) [1]	.24	.99	1.41	1 11	.91	.90	.17	.45	.77	1 17	1.21	1.07
Professional service	.09	.23	.41	1.13	1.64	1.19	.44	.57	.67	1 02	1.40	1.29
Domestic and personal service	55	.85	.94	1.18	.97	.85	.45	.89	1.05	1.14	.95	.81
Clerical occupations	2.50	1.15	.94	.93	.60	.29	.67	.91	.91	1 20	.90	.49

[1] N. e. c.=Not elsewhere classified.

With respect to the Negro workers the order of the age groups as regards variability differs in the two census years, and in neither year is the order the same as that shown by the white workers. In each census year, however, as in the instance of the white workers, the age group 10–17 shows the greatest variability, the occupational groups yielding the minimum and maximum ratios in 1920 and 1930, respectively, being the same as those for the white workers. Thus in 1920 this particular age group among the Negro workers varied from 0.09 (professional service) to 2.50 (clerical occupations) and in

1930 from 0.17 (public service) to 1.83 (agriculture, forestry, and animal husbandry). Only in 1920 was the age group 25–44 least variable, the minimum and maximum values being 0.80 (agriculture, forestry, and animal husbandry) and 1.24 (transportation and communication), respectively. Ten years later the corresponding age group was 20–24, varying from 0.67 (professional service) to 1.12 (transportation and communication). The lowest minimum and the highest maximum among the Negroes were both furnished by the age group 10–17 in 1920.

This section dealing with the variability of the occupational ratios in the different age groups may be conveniently concluded as follows: (1) There is considerable variability among the occupational ratios in the age groups of each color. (2) The variability fluctuates from age group to age group, the order of the groups of the 2 colors differing from each other, and in the instance of the Negroes differing with respect to census year. (3) The age group 25–44 is least variable; however, this group assumes second place among the Negroes of 1930, the age group 20–44 being first. (4) The age group 10–17 is most variable in each color group and census year. (5) The magnitudes of the ratios are such that it is impossible to place the various age-distributed occupational groups in any definite order, the phenomenon holding in each color group and census year.

Age changes in the ratios.—Figures 2 and 3 show graphically for each census year how the age changes in the ratios of the different occupational groups compare with regard to color. In both figures the points corresponding to successive ratios have been joined to facilitate reading. The graphs reveal that, first, the ratios of no occupational group lie consistently above or below the normal level of workers, each occupational group showing dearths and excesses of workers varying with age; second, many age groups for the same census year yield similar ratios for the white and Negro workers of particular occupational groups; third, the trends of the ratios for 1930 are in many instances similar to the corresponding ratio trends of 1920; and, finally, no occupational group shows its graphs for the two races entirely separate, indicating that for particular age groups only may the ratios for a specific occupational group be ordered with respect to race.

As in the second and third papers of the series the trends of the age curves of the occupational groups (figures 2 and 3) may be classified with some exceptions into four categories, depending upon the appearance of dearths and excesses of workers. Thus, first, an excess may be early and late with a dearth intervening; second, a dearth may be early and late with an excess intervening; third, a dearth may be early and followed subsequently by an excess; or, fourth, an excess may appear early and be followed later by a dearth. These four categories

correspond to the following trends, respectively, U-shaped, inverted U-shaped, line with an ascending slope, and a line with a descending slope.

Agriculture, forestry, and animal husbandry, with its excesses appearing early and late, and a dearth intervening, is the only occupa-

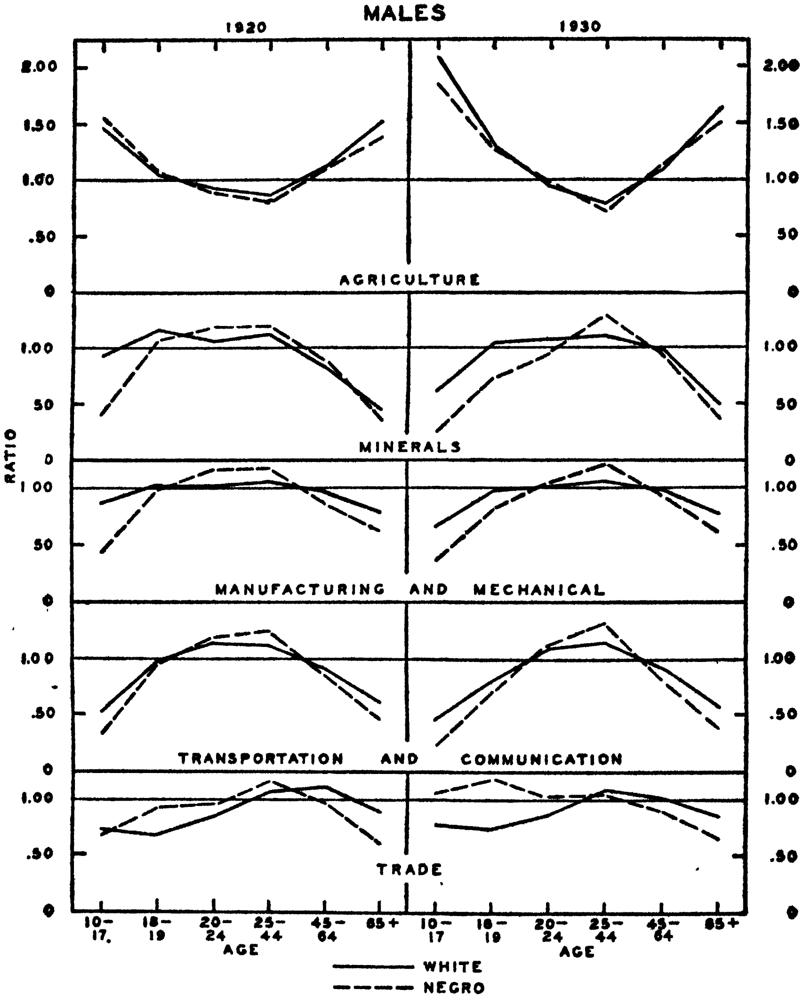

FIGURE 2.—Age-specific ratios of the percentages of gainful white and Negro male workers in different occupational groups to the percentages for all groups, 1920 and 1930; white and Negro male workers in specific occupational groups compared (*Agriculture, forestry, and animal husbandry* is abbreviated *agriculture*, while *extraction of minerals* reads *minerals*. Points are joined by straight lines to facilitate reading.)

tional group assignable to the first category. It will be observed that the curves for the two races are similar in each year and that the excesses of 1930, particularly in the early ages, are greater than those of 1920.

Extraction of minerals, manufacturing and mechanical industries, and transportation and communication belong definitely to the second class, indicating dearths early and late with an excess intervening. Color differences are shown in both census years in certain of the age groups. Thus in each year extraction of minerals and the manu-

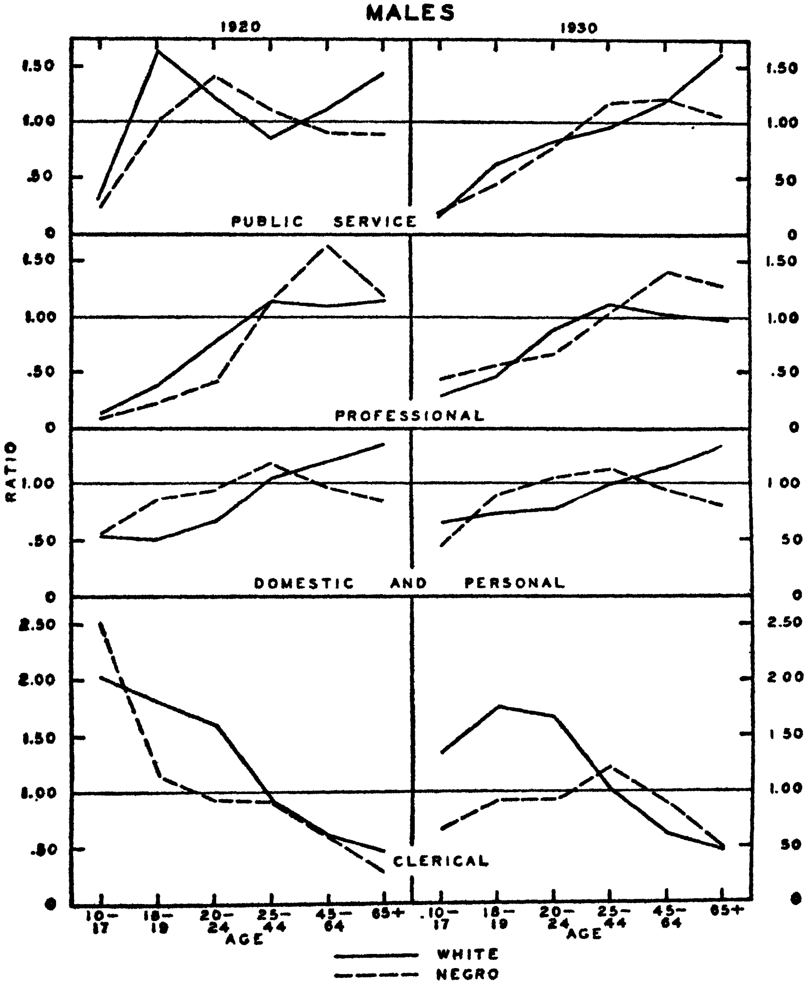

FIGURE 3.—Age-specific ratios of the percentages of gainful white and Negro male workers in different occupational groups to the percentages for all groups, 1920 and 1930; white and Negro male workers in specific occupational groups compared. (Points are joined by straight lines to facilitate reading.)

facturing and mechanical industries disclose larger dearths of child workers among the Negroes than among the white workers. In 1920 trade is also assignable to the second class; in 1930, however, the Negroes assume a descending trend, with excesses in the early ages and dearths in the later ones. Moreover, in 1920 the dearth among

the old-aged Negroes is greater than the dearth shown by the white workers of the corresponding age group.

The behavior of public service differs considerably in the two census years. In 1930 both races are on an ascending trend, with a greater excess in the old-aged group among the white workers. In 1920, while the trends are ascending with similar dearths in the child group, the old-aged group shows the white workers with a large excess and the Negroes with a slight dearth; noteworthy also is the large excess of white workers in the age group 18–19. Professional service shows ascending trends in both years, with dearths in the child group and excesses in the later ages. In both years the Negroes show larger excesses than the white workers in the older ages.

The curves of domestic and personal service behave similarly in both years, the white workers on an ascending trend and the Negroes on an inverted U. In each year both races show dearths in the child group, and in the later ages excesses among the white workers and dearths among the Negroes.

The clerical occupations present dissimilar pictures with respect to census year. With the exception of the Negroes of 1930 this occupational group discloses decreasing ratio trends with age. The excesses of the child group of 1920 are large, as are also the dearths of the later ages. The excess of the child group in the instance of the Negro workers, which is well above the excess for the white workers, rapidly declines to a dearth in the group 20–24, the decline continuing through the older ages; the white workers, on the other hand, show a similar but less rapid decline, reaching a dearth in the group 25–44 and continuing beyond through the older ages. Ten years later the excess of the white child group appears smaller, the excess of the Negro children becoming a dearth. In the older ages the lapse of 10 years effected a decrease in the dearth of Negro workers, while the dearth of white workers remains approximately the same.

SUMMARY

This fourth paper of a series investigates the age of gainful white and Negro male workers of the United States for the census years 1920 and 1930. The percentage age distribution for each occupational group is compared with the percentage age distribution of all gainful male workers by forming the ratios of corresponding percentages. The computed ratios, indicating excesses or dearths of workers, are specific for occupational group, age group, color, and census year. The results may be briefly summarized as follows:

1. Differences in the trends of the ratios for the white and Negro workers, respectively, were found among the occupational groups.

2. With some exceptions the ratio trends for 1920 for the white and Negro workers were similar in a given occupational group. Ten years later the picture remained much the same.

3. Differences with respect to color were found in each census year but only in certain of the age groups of specific occupational groups. Chief among these differences were:

(*a*) The larger dearth among the Negroes of both census years in the child group of extraction of minerals, and the manufacturing and mechanical industries.

(*b*) The larger dearth among the Negroes of 1920 in the old-aged group of trade. Also in trade there was in 1930 a dearth of white workers in the younger ages while the Negroes showed an excess.

(*c*) The large excesses among the white workers of 1920 and 1930 in the old-aged group of public service. In 1920 the Negroes showed a dearth in this age group which became a slight excess 10 years later.

(*d*) The larger excesses among the Negroes of both years in the older ages of professional service.

(*e*) The excesses of white workers and the dearths of Negro workers of both years in the older ages of domestic and personal service.

(*f*) The larger excess of Negroes in 1920 in the child group of clerical occupations. In 1930 the excesses of both white and Negro workers decreased, the excess of the latter becoming a dearth.

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(*1*) Gafafer, W. M.: (1937) Age of gainful workers of the United States, 1920 and 1930. Studies on the age of gainful workers, no. 1. Pub. Health Rep., **52**: 269–281. (Reprint No. 1806.)

(*2*) ———: (1937) Age of gainful male workers in different geographic regions of the United States, 1920 and 1930. Studies on the age of gainful workers, no. 2. Ibid., **52**: 437–453. (Reprint No. 1815.)

(*3*) ———: (1937) Age of gainful female workers in different geographic regions of the United States, 1920 and 1930. Studies on the age of gainful workers, no. 3. Ibid., **52**: 730–748. (Reprint No. 1829.)

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THREE OUTBREAKS OF FOOD POISONING TRACED TO CREAM-FILLED PASTRY

Since the notes on a typhoid outbreak traced to a carrier engaged in filling cream puffs and "Preventing Typhoid and Bacterial Food Poisoning From Cream-filled Pastry" were published in the Public Health Reports,[1] the Health News for June 28, 1937, issued by the New York State Department of Health, has appeared with a report

[1] July 9, 1937, pp. 929–932. For California State Board of Health regulations regarding cream and custard fillings, see the Public Health Reports for June 11, 1937, pp. 765–772.

of three outbreaks of food poisoning, from which the following is taken:

Three outbreaks of food poisoning ascribed to the eating of cream-filled pastry purchased either directly or indirectly from one bakery in Troy have been reported since April 1936.

The first occurred among employees of a factory in North Albany in April 1936, and was ascribed to the consumption of chocolate eclairs. There were six cases but no fatalities.

The second outbreak occurred in May 1937, and comprised five cases in two families residing in the same house and a case in a third family in Troy. There were no fatalities. The illness was ascribed to the consumption of strawberry cream pie. All members of these families who had not eaten of the pie remained well. No portion of the suspected strawberry cream pie was available for laboratory examination.

Concurrent with the outbreak in Troy, four cases of gastroenteritis in one household were reported from Rensselaer and ascribed to the eating of a coconut cream pie, obtained from the bakery in Troy from which the strawberry cream pies before mentioned had been obtained. Another case of similar illness occurred at the same time in another home in Rensselaer, also ascribed to eating coconut cream pie from this same bakery.

The third outbreak, also in Troy, occurred on June 1, 1937, and comprised 12 cases with no fatalities. Eleven of the cases occurred in 3 households, having a total membership of 15. The illness was attributed to the eating of strawberry cream pie purchased from the bakery involved in the previously mentioned outbreaks. The four members of the household who remained well had not partaken of the pie. There also was reported at this time a case of gastroenteritis in a resident of North Troy who had eaten a portion of a coconut cream pie from this bakery. Other members of the family who had not eaten of the pie remained well.

The onset of illness in these outbreaks followed within one-half to 4 hours after ingestion of the cream-filled pastry. The symptoms were nausea, vomiting, abdominal cramps, diarrhea, and in some instances considerable prostration.

Investigation disclosed that the cream-filled pastries supplied by the bakery in question were not subjected to refrigeration at the bakery. In connection with each outbreak all food-handler employees of the bakery were examined but no evidence of illness or of skin lesions was discovered. The bakery was carefully inspected and found to be in satisfactory sanitary condition.

A MILK-BORNE EPIDEMIC OF SCARLET FEVER[1]

According to a preliminary report, a scarlet-fever outbreak, comprising 11 cases, with no fatalities, recently occurred in the town of Chautauqua in Chautauqua County, N. Y. It began on May 27 and ended on June 4. All but two of the patients had drunk raw milk sold without a permit by a local dairyman. The two exceptions used milk from their own cow exclusively. The cases were limited to nine families. Three of the nine patients who drank the suspected milk were under 15 years of age and six were over that age. Four of the eleven patients were males and seven were females. The outbreak subsided with the prohibition of further sale of milk from the suspected dairy.

The first patient, whose onset of illness was reported as May 27, was a student boarder in the dairyman's home and is said to have been in no way connected with the milking, milk handling, or the washing of milk utensils, nor to have entered the barn or the milk house. She left for her own home, in another city, on May 27 and developed a scarlet rash on the following day.

The dairyman's household consisted of himself, his wife, and this student boarder. The dairyman and his wife denied any history of recently having had sore throat. The dairyman, however, had an infection on the dorsum of his left thumb, which is said to have begun on May 28. On the same day, he received a kick on his right leg from a cow and in 2 days developed a small discharging ulcer with a surrounding cellulitis.

Obviously, the dairyman could not have been the source of infection of the first patient. Through the medium of his infectious thumb he may, however, have contaminated the milk, and so have been the source of infection of the other eight patients, since their onsets of illness occurred between May 31 and June 4. The dairyman himself did all the milking, bottling, and capping. The bottling was done by hand and the capping by thumb. His wife washed the milk utensils. There was no history of mastitis or of injury to the udders of any of his cows according to the dairyman.

Throat cultures from the dairyman and his wife and from all patients were sent to the laboratory of the State department of health, as well as cultures from the wound on the right leg of the dairyman. No cultures were obtained from the infected thumb of the dairyman, since the infection had healed at the time when the investigation of the outbreak was begun. Milk samples from each quarter of the four milk cows were also submitted to the laboratory.

[1] Health News, June 28, 1937, issued by the New York State Department of Health.

From the foregoing, it would seem that milk from the suspected dairy was probably responsible for the outbreak. The source of contamination of the milk has not yet been determined, but further investigations are being made.

DEATHS DURING WEEK ENDED JULY 3, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 3, 1937	Corresponding week, 1936
Data from 86 large cities in the United States:		
Total deaths	7,473	7,543
Average for 3 prior years	7,704	
Total deaths, first 26 weeks of year	241,493	238,327
Deaths under 1 year of age	543	477
Average for 3 prior years	553	
Deaths under 1 year of age, first 26 weeks of year	15,017	14,916
Data from industrial insurance companies:		
Policies in force	70,021,076	68,517,742
Number of death claims	11,729	12,607
Death claims per 1,000 policies in force, annual rate	8.7	9.2
Death claims per 1,000 policies, first 26 weeks of year, annual rate	10.7	10.6

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 10, 1937, and July 11, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 10, 1937	Week ended July 11, 1936	Week ended July 10, 1937	Week ended July 11, 1936	Week ended July 10, 1937	Week ended July 11, 1936	Week ended July 10, 1937	Week ended July 11, 1936
New England States:								
Maine	1				21	131	0	0
New Hampshire	1				47	3	0	0
Vermont	1				6	12	0	0
Massachusetts	6	12			215	377	3	0
Rhode Island		1			20	17	0	0
Connecticut	4	1			43	53	0	1
Middle Atlantic States.								
New York [1]	39	40		[2] 2	637	1,066	15	11
New Jersey	10	7	2	9	517	321	2	8
Pennsylvania	18	15			630	287	6	3
East North Central States.								
Ohio	6	13	2	7	483	54	2	3
Indiana	15	3	8	6	152	3	1	0
Illinois	35	41	10	24	326	21	3	5
Michigan	20	15		1	260	34	1	2
Wisconsin	8	3	18	4	51	91	0	2
West North Central States.								
Minnesota	1	2		11	2	53	0	0
Iowa [3]	2	5			6	2	0	0
Missouri	3	6	24	27	16	16	1	3
North Dakota							1	0
South Dakota		2				3	0	0
Nebraska	2	6			7	3	1	1
Kansas	5	12		4	4	10	0	1
South Atlantic States:								
Delware [3]		1			2		0	0
Maryland [3, 4]	3	3		1	16	124	0	3
District of Columbia	3	2			34	51	0	2
Virginia [3]	6	7			78	60	3	2
West Virginia	2	1	4	4	34	29	6	5
North Carolina [3, 5]	6	13		1	127	12	2	7
South Carolina	1	3	53	36	18	5	0	0
Georgia [5]	7	5					0	2
Florida [3]	6	2	2		1	4	3	4
East South Central States:								
Kentucky	5	4	1	1	96	7	3	4
Tennessee	3	2	14	9	69	8	3	3
Alabama [5]	6	11	2	2	25	2	4	2
Mississippi [4]	4	8					4	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 10, 1937, and July 11, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 10, 1937	Week ended July 11, 1936	Week ended July 10, 1937	Week ended July 11, 1936	Week ended July 10, 1937	Week ended July 11, 1936	Week ended July 10, 1937	Week ended July 11, 1936
West South Central States:								
Arkansas	4	6	3	4	9		5	1
Louisiana	9	7	43	18	5	9	2	0
Oklahoma [6]	3	1	4	7	17		1	1
Texas [5]	14	11	60	67	147	76	4	3
Mountain States:								
Montana [3]				1	8	2	0	0
Idaho [3]		1	2	1	3	5	1	0
Wyoming [3]						3	0	0
Colorado	2	1			36	12	0	0
New Mexico	1		1	2	14	5	0	0
Arizona	1	1	6	8	15	37	1	0
Utah [4]		1			41	22	0	0
Pacific States:								
Washington	2				60	92	0	0
Oregon [3]	1		6	1	3	15	0	1
California	22	25	10	116	84	323	5	4
Total	288	300	275	374	4,385	3,451	83	79
First 27 weeks of year	11,937	12,985	273,110	138,957	229,118	259,740	3,792	5,485

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 10, 1937	Week ended July 11, 1936	Week ended July 10, 1937	Week ended July 11, 1936	Week ended July 10, 1937	Week ended July 11, 1936	Week ended July 10, 1937	Week ended July 11, 1936
New England States:								
Maine	2	1	3	17	0	0	0	1
New Hampshire	0	0	6	3	0	0	0	0
Vermont	0	3	2	7	0	0	0	1
Massachusetts	3	1	73	66	0	0	1	0
Rhode Island	0	0	16	10	0	0	0	0
Connecticut	2	0	25	10	0	0	2	4
Middle Atlantic States:								
New York [1]	6	4	212	225	0	0	19	8
New Jersey	1	1	43	90	0	0	3	6
Pennsylvania	0	0	131	121	0	0	13	3
East North Central States:								
Ohio	9	1	100	40	1	0	10	12
Indiana	1	0	28	28	3	1	17	3
Illinois	2	8	149	183	4	13	6	12
Michigan	1	1	237	129	0	0	3	3
Wisconsin	1	0	83	115	1	21	0	4
West North Central States:								
Minnesota	0	0	39	58	2	4	0	0
Iowa [3]	0	0	23	46	19	5	1	2
Missouri	22	0	19	37	4	11	14	11
North Dakota	0	1	8	3	11	1	0	0
South Dakota	0	0	9	2	0	5	0	0
Nebraska	0	0	13	14	1	3	2	1
Kansas	3	2	40	63	0	5	6	5
South Atlantic States:								
Delaware [3]	1	0	2	2	0	0	0	0
Maryland [3 4]	0	1	12	18	0	0	6	4
District of Columbia	0	0	2	1	0	0	4	0
Virginia [3]	3	0	6	14	0	0	16	14
West Virginia	0	2	11	17	0	0	10	5
North Carolina [3 5]	4	2	15	25	0	0	19	18
South Carolina	0	1	3	4	0	0	21	16
Georgia [5]	6	1	10	5	0	0	38	39
Florida [5]	0	0	0	0	0	0	1	0
East South Central States:								
Kentucky	[7] 7	1	15	10	2	0	26	17
Tennessee	11	12	7	4	0	0	24	20
Alabama [5]	4	82	5	14	2	0	19	26
Mississippi [4]	20	0	1	5	0	0	20	20

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 10, 1937, and July 11, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 10, 1937	Week ended July 11, 1936	Week ended July 10, 1937	Week ended July 11, 1936	Week ended July 10, 1937	Week ended July 11, 1936	Week ended July 10, 1937	Week ended July 11, 1936
West South Central States:								
Arkansas	36	0	4	1	0	0	34	22
Louisiana	8	1	4	6	0	0	21	19
Oklahoma [6]	55	0	8	5	0	0	16	13
Texas [5]	36	0	26	8	6	0	61	29
Mountain States:								
Montana [3]	1	0	12	31	18	12	1	2
Idaho [3]	0	0	15	3	4	2	0	0
Wyoming [3]	0	0	5	11	0	14	0	0
Colorado	0	0	11	21	3	0	2	0
New Mexico	1	0	3	10	0	0	2	5
Arizona	2	0	12	6	0	0	4	0
Utah [4]	0	0	6	12	1	1	0	0
Pacific States:								
Washington	0	1	10	14	2	4	1	9
Oregon [3]	0	0	5	9	10	1	0	4
California	8	8	81	125	2	0	11	11
Total	256	135	1,550	1,648	96	103	454	379
First 27 weeks of year	1,071	658	158,823	172,491	7,466	5,625	4,245	4,089

[1] Psittacosis, week ended July 10, 1937, 3 suspected cases in New York.
[2] New York City only.
[3] Rocky Mountain spotted fever, week ended July 10, 1937, 12 cases, as follows: Iowa, 1; Delaware, 1; Maryland, 1, Virginia, 3, North Carolina, 1; Montana, 1; Idaho, 1, Wyoming, 1; Oregon, 2.
[4] Week ended earlier than Saturday
[5] Typhus fever, week ended July 10, 1937, 58 cases, as follows: North Carolina, 1; Georgia, 27; Florida, 6; Alabama, 11, Texas, 13
[6] Figures for 1936 are exclusive of Oklahoma City and Tulsa.
[7] 1 nonparalytic case included.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May 1937										
Massachusetts	33	21			2,953	2	1	977	0	4
June 1937										
Connecticut	2	37	6	2	472		0	379	0	6
Delaware	2	1			68		0	14	0	2
District of Columbia	9	54	1		358		0	27	0	10
Georgia		10	26	538	13	71	8	24	0	85
Idaho	2	6	12		165		0	55	13	5
Iowa	1	9	3	2	43		0	357	108	13
Maine		3			81		0	50	0	2
North Carolina	13	46	17	32	1,169	119	14	67	1	30
Vermont		3			15		0	10	0	1
West Virginia	9	25	60	1	187	3	1	108	1	15
Wyoming		2			20		0	46	9	2

Summary of monthly reports from States—Continued

May 1937

	Cases
Massachusetts:	
Anthrax	1
Chicken pox	1,579
Dysentery (amoebic)	1
Dysentery (bacillary)	1
German measles	259
Lead poisoning	3
Mumps	747
Ophthalmia neonatorum	96
Paratyphoid fever	81
Rabies in animals	14
Septic sore throat	26
Typhus fever	1
Undulant fever	1
Whooping cough	1,220

June 1937

	Cases
Chicken pox:	
Connecticut	688
Delaware	27
District of Columbia	94
Georgia	86
Idaho	41
Iowa	135
Maine	151
North Carolina	211
Vermont	52
West Virginia	90
Wyoming	31
Conjunctivitis:	
Connecticut	1
Georgia	4
Idaho	2
Dengue:	
Georgia	1
Dysentery:	
Connecticut (amoebic)	1
Connecticut (bacillary)	2
Georgia (amoebic)	23
Georgia (bacillary)	200
Iowa (bacillary)	1
North Carolina (bacillary)	4
West Virginia (bacillary)	10
Encephalitis, epidemic or lethargic:	
Iowa	2

June 1937—Continued

	Cases
Favus:	
Georgia	1
German measles:	
Connecticut	47
Delaware	2
Idaho	1
Iowa	9
Maine	24
North Carolina	76
Vermont	25
Wyoming	8
Hookworm disease:	
Georgia	361
Lead poisoning:	
Connecticut	1
Mumps:	
Connecticut	426
Delaware	11
Georgia	80
Idaho	39
Iowa	36
Maine	100
Vermont	226
West Virginia	27
Wyoming	38
Ophthalmia neonatorum:	
Connecticut	1
North Carolina	3
Paratyphoid fever:	
Connecticut	1
Georgia	1
Maine	1
North Carolina	2
Wyoming	1
Puerperal septicemia:	
Georgia	2
Rabies in man:	
Georgia	1
North Carolina	1
Rabies in animals:	
Connecticut	11
West Virginia	5
Rocky Mountain spotted fever:	
District of Columbia	4
Idaho	6
Iowa	10
North Carolina	4
Wyoming	27

June 1937—Continued

	Cases
Septic sore throat:	
Connecticut	19
Georgia	21
Idaho	5
Iowa	2
Maine	1
North Carolina	4
Wyoming	6
Tetanus:	
Connecticut	1
Georgia	1
Trichinosis:	
Connecticut	1
Georgia	1
Tularemia:	
Georgia	3
North Carolina	2
Wyoming	1
Typhus fever:	
Georgia	80
North Carolina	4
Undulant fever:	
Connecticut	3
Georgia	11
Iowa	14
Maine	2
Vermont	5
Vincent's infection:	
Idaho	1
Maine	7
Whooping cough:	
Connecticut	258
Delaware	51
District of Columbia	79
Georgia	173
Idaho	34
Iowa	124
Maine	132
North Carolina	1,013
Vermont	45
West Virginia	375
Wyoming	40

PLAGUE INFECTION IN BANNOCK COUNTY, IDAHO, AND WALLOWA COUNTY, OREG.

On July 7 and 8, 1937, plague infection was reported to have been determined in tissue from an unspecified number of ground squirrels, *Citellus armatus*, shot in the Cache National Forest 15 miles north of Lava Hot Springs, Bannock County, Idaho, and in a lot of 56 fleas and 1 tick from 7 ground squirrels of the same species shot at a place 5 miles farther north in the same county.

Under date of July 7, plague infection was reported proved in tissue from a ground squirrel, *Citellus columbianus*, shot on a ranch 6½ miles southwest of Lostine, Wallowa County, Oreg., and in a lot of 264 fleas from 56 ground squirrels, *Citellus columbianus*, shot in sections 5, 8, 9, and 17, of township 1 S., R. 43 E., in the same county.

CASES OF VENEREAL DISEASES REPORTED FOR MAY 1937

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama	1,366	4 77	438	1 53
Arizona [1]				
Arkansas	614	3 04	325	1.61
California	1,601	2 64	1,573	2 60
Colorado	214	2 01	151	1 42
Connecticut [2]	211	1 22	79	.46
Delaware	225	8 69	37	1.43
District of Columbia	162	2 62	144	2.33
Florida	71	43	22	.13
Georgia	1,905	6.23	458	1.50
Idaho	54	1.11	46	.95
Illinois	2,604	3 32	1,409	1.80
Indiana	229	.66	74	.21
Iowa [2]	329	1 29	190	.75
Kansas	205	1 09	53	.28
Kentucky [1]				
Louisiana	179	.84	72	.34
Maine [2]	50	59	40	.47
Maryland	811	4 84	254	1 52
Massachusetts	534	1 21	486	1.10
Michigan	542	1.13	429	.90
Minnesota	303	1 15	252	.96
Mississippi	2,139	10 65	2,696	13.43
Missouri	331	.84	228	.58
Montana [1]				
Nebraska	122	.89	77	.56
Nevada [3]				
New Hampshire	12	24	6	.12
New Jersey	664	1 53	223	.52
New Mexico	135	3.20	23	.55
New York	7,965	6.16	1,657	1.28
North Carolina	2,586	7.48	555	1 61
North Dakota	22	31	71	1.01
Ohio [2]	1,272	1 89	324	48
Oklahoma [2]	521	2 06	399	1.58
Oregon [1]				
Pennsylvania [4]	2,066	2 04	186	.18
Rhode Island	102	1 50	38	.56
South Carolina [2]	481	2.59	438	2 35
South Dakota	17	25	27	.39
Tennessee	920	3.21	351	1.23
Texas	1,374	2.25	228	.37
Utah [3]				
Vermont	19	.50	27	.71
Virginia	1,186	4 44	98	.37
Washington	275	1.67	362	2.20
West Virginia [2]	390	2.13	163	.89
Wisconsin [4]	31	.11	89	.31
Wyoming [3]				
Total	34,839	2.84	14,798	1 21

See footnotes at end of table

Reports from cities of 200,000 population or over

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Akron, Ohio				
Atlanta, Ga	140	4.88	118	4.11
Baltimore, Md	438	5.31	133	1.61
Birmingham, Ala.[1]				
Boston, Mass	221	2.79	173	2.19
Buffalo, N. Y	225	3.80	80	1.35
Chicago, Ill	1,347	3.78	950	2.66
Cincinnati, Ohio[1]				
Cleveland, Ohio	260	2.79	59	.63
Columbus, Ohio	59	1.93	16	.52
Dallas, Tex	236	8.15	68	2.35
Dayton, Ohio	69	3.28	17	.81
Denver, Colo	95	3.20	65	2.19
Detroit, Mich	289	1.67	233	1.35
Houston, Tex.[5]	205	6.12	51	1.52
Indianapolis, Ind	18	.48	28	.74
Jersey City, N. J.[1]				
Kansas City, Mo	48	1.14	9	.21
Los Angeles, Calif.[1]				
Louisville, Ky.[1]				
Memphis, Tenn	227	8.50	42	1.57
Milwaukee, Wis[1]				
Minneapolis, Minn	92	1.89	73	1.50
Newark, N. J	193	4.16	85	1.83
New Orleans, La.[1]				
New York, N. Y	6,397	8.76	1,078	1.48
Oakland, Calif	69	2.28	64	2.11
Omaha, Nebr	79	4.59	23	1.04
Philadelphia, Pa	65	.33	15	.08
Pittsburgh, Pa[1]				
Portland, Oreg[3]				
Providence, R. I	55	2.12	21	.81
Rochester, N. Y	49	1.45	38	1.13
St. Louis, Mo	252	3.13	223	2.67
St. Paul, Minn	37	1.31	40	1.42
San Antonio, Tex	81	3.22	89	3.54
San Francisco, Calif	105	1.57	140	2.09
Seattle, Wash	110	2.90	133	3.50
Syracuse, N. Y	88	4.04	30	1.38
Toledo, Ohio	83	2.73	35	1.15
Washington, D. C.[6]	162	2.73	144	2.42

[1] No report for current month.
[2] Incomplete.
[3] Not reporting.
[4] Only cases of syphilis in the infectious stage are reported.
[5] Reported by Jefferson Davis Hospital; physicians are not required to report venereal diseases.
[6] Reported by the Social Hygiene Clinic.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 3, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	163	52	18	2,869	361	898	10	391	61	1,261	-------
Current week [1]	110	21	13	2,044	313	668	8	372	44	1,419	-------
Maine:											
Portland	0	------	0	1	1	2	0	0	0	7	20
New Hampshire:											
Concord	1	------	0	0	0	0	0	0	0	0	12
Manchester	0	------	0	0	0	0	0	2	0	0	14
Nashua	0	------	0	0	0	1	0	0	0	0	8
Vermont:											
Barre	1	------	0	0	0	0	0	0	0	0	4
Burlington	1	------	0	0	0	0	0	0	0	0	12
Rutland	0	------	0	0	1	0	0	0	0	4	9
Massachusetts:											
Boston	1	------	0	24	12	32	0	16	0	34	176
Fall River	0	------	0	22	1	1	0	2	0	4	32
Springfield	0	------	0	1	0	0	0	1	0	1	37
Worcester	0	------	0	2	6	4	0	2	0	11	47
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	14
Providence	0	------	0	32	3	8	0	1	0	17	61
Connecticut:											
Bridgeport	0	------	0	0	1	14	0	1	0	0	36
Hartford	0	------	0	17	1	0	0	8	0	2	39
New Haven	0	------	0	0	1	1	0	0	0	3	23
New York:											
Buffalo	0	------	1	30	7	4	0	10	0	35	146
New York	29	5	2	331	48	68	0	78	7	84	1,237
Rochester	0	------	0	8	2	4	0	0	0	13	60
Syracuse	0	------	0	24	2	6	0	0	0	37	51
New Jersey:											
Camden	0	------	0	6	0	3	0	0	0	2	23
Newark	0	------	0	14	4	6	0	9	0	11	82
Trenton	0	------	0	20	1	4	0	3	0	0	29
Pennsylvania:											
Philadelphia	4	------	0	19	12	41	0	16	4	82	374
Pittsburgh	1	2	0	180	9	18	0	9	1	70	127
Reading	0	------	0	15	0	3	0	0	0	2	21
Scranton	0	------	-------	0	------	2	0	-------	0	0	-------
Ohio:											
Cincinnati	1	------	0	17	8	6	0	10	0	41	129
Cleveland	3	------	0	288	3	27	0	12	0	34	151
Columbus	0	1	1	10	4	2	0	2	0	30	84
Toledo	1	1	1	123	1	3	1	2	0	42	66
Indiana:											
Anderson	0	------	0	12	0	2	0	0	0	3	9
Fort Wayne	0	------	0	1	0	1	0	1	0	1	22
Indianapolis	1	------	0	67	9	3	0	3	0	29	110
Muncie	0	------	0	0	0	0	0	1	0	0	13
South Bend	0	------	0	0	0	1	0	0	0	0	13
Terre Haute	1	------	0	0	0	0	0	0	0	0	19
Illinois:											
Alton	0	------	0	1	0	0	0	0	0	0	12
Chicago	9	2	2	326	28	97	0	28	1	60	598
Elgin	0	------	0	0	1	1	0	0	0	3	13
Moline	0	------	0	0	0	0	1	0	0	10	8
Springfield	1	------	0	8	1	2	0	0	0	7	22
Michigan:											
Detroit	14	------	0	98	10	130	0	10	2	46	240
Flint	1	------	0	2	3	6	0	3	0	5	30
Grand Rapids	0	------	0	32	0	4	0	0	0	28	28
Wisconsin:											
Kenosha	0	------	0	1	0	0	0	0	0	0	9
Madison	0	------	0	0	0	1	0	0	0	5	25
Milwaukee	1	------	0	20	2	26	0	1	0	58	102
Racine	0	------	0	0	0	4	0	1	0	0	9
Superior	0	------	0	0	1	0	0	0	0	0	6

[1] Figures for Topeka, Kans., estimated; report not received.

City reports for week ended July 3, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Minnesota:											
Duluth	0	------	0	0	1	11	0	1	0	2	16
Minneapolis	0	------	0	0	6	14	0	3	0	8	78
St. Paul	0	------	0	0	5	3	0	1	0	71	61
Iowa:											
Cedar Rapids	0	------	------	1	------	0	0	------	0	0	------
Davenport	0	------	------	0	------	2	0	------	0	0	------
Des Moines	1	------	------	0	------	11	3	------	0	0	21
Sioux City	0	------	------	0	------	1	1	------	0	0	------
Waterloo	0	------	------	0	------	4	0	------	0	5	------
Missouri:											
Kansas City	2	------	0	1	3	7	2	3	0	6	84
St. Joseph	0	------	0	0	0	1	0	1	0	1	26
St. Louis	3	------	0	55	7	18	0	12	5	55	249
North Dakota:											
Fargo	0	------	0	0	1	0	2	0	0	33	7
Grand Forks	0	------	------	0	------	0	0	------	0	13	------
Minot	0	------	0	0	0	0	0	0	0	0	7
South Dakota:											
Aberdeen	0	------	------	0	------	2	0	------	0	0	------
Nebraska:											
Omaha	0	------	0	1	0	2	2	4	0	12	68
Kansas:											
Lawrence	0	------	0	0	1	0	0	0	0	3	5
Topeka	------	------	------	------	------	------	------	------	------	------	------
Wichita	0	------	0	4	0	2	0	1	0	18	23
Delaware:											
Wilmington	0	------	0	0	1	0	0	1	0	1	24
Maryland:											
Baltimore	6	------	1	47	8	9	0	11	0	73	183
Cumberland	0	------	0	0	1	0	0	0	0	1	10
Frederick	0	------	0	0	1	0	0	0	0	0	5
Dist. of Col.:											
Washington	8	------	0	42	5	4	0	11	7	14	124
Virginia:											
Lynchburg	1	------	0	5	1	0	0	0	0	15	15
Norfolk	0	------	0	4	0	0	0	1	0	3	21
Richmond	1	------	0	9	2	0	0	1	1	0	47
Roanoke	1	------	0	8	0	0	0	0	0	0	13
West Virginia:											
Charleston	0	------	0	0	0	0	0	1	1	0	4
Huntington	0	------	------	1	------	0	0	------	0	0	------
Wheeling	0	------	0	0	0	0	0	0	1	15	10
North Carolina:											
Gastonia	1	------	------	0	------	0	0	------	0	1	------
Raleigh	0	------	0	1	0	0	0	1	0	2	25
Wilmington	0	------	0	0	1	0	0	0	0	10	17
Winston-Salem	0	------	0	0	3	1	0	0	3	5	11
South Carolina:											
Charleston	0	------	0	1	2	0	0	2	1	0	24
Florence	0	------	0	0	1	0	0	0	0	0	15
Greenville	0	------	0	0	1	0	0	2	1	0	25
Georgia:											
Atlanta	0	------	1	0	0	5	0	4	1	18	81
Brunswick	0	1	1	0	1	0	0	1	0	0	6
Savannah	0	1	0	0	0	0	0	4	2	6	39
Florida:											
Miami	0	1	0	0	3	2	0	5	1	0	29
Tampa	0	1	1	15	1	1	0	1	1	0	22
Kentucky:											
Ashland	0	------	------	2	------	0	0	------	0	3	0
Covington	0	------	0	4	0	0	0	1	0	9	12
Lexington	0	------	0	0	0	0	0	2	0	5	22
Louisville	0	------	1	31	8	4	0	4	0	79	75
Tennessee:											
Knoxville	0	------	0	0	4	0	0	2	3	0	39
Memphis	0	------	0	27	1	0	0	7	0	43	96
Nashville	0	------	0	2	4	0	0	1	0	0	54
Alabama:											
Birmingham	1	------	0	12	3	1	0	7	2	9	74
Mobile	0	------	0	0	2	0	0	2	0	1	27
Montgomery	0	------	------	1	------	1	0	------	0	0	------
Arkansas:											
Fort Smith	0	------	------	0	------	1	0	------	0	0	------
Little Rock	0	------	0	0	1	0	0	1	0	0	2

City reports for week ended July 3, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Louisiana:											
Lake Charles	0	------	0	2	1	0	0	0	0	1	5
New Orleans	2	3	2	1	15	5	0	16	0	12	153
Shreveport	0	------	0	1	6	0	0	1	1	0	68
Oklahoma:											
Muskogee	0	------	------	0	------	1	0	------	0	0	------
Oklahoma City	0	------	0	0	2	3	0	0	0	0	41
Tulsa	0	------	------	5	------	1	0	------	0	22	------
Texas:											
Dallas	3	------	0	11	3	2	0	2	0	33	68
Fort Worth	0	------	0	0	1	0	0	2	0	0	40
Galveston	0	------	0	0	3	0	0	2	0	0	22
Houston	2	1	0	2	5	1	0	1	1	29	78
San Antonio	0	------	0	0	6	0	0	3	0	0	78
Montana:											
Billings	0	------	0	0	2	0	0	0	0	0	6
Great Falls	0	------	0	0	0	1	1	0	0	6	4
Helena	0	------	0	0	0	0	0	0	0	0	8
Missoula	0	------	0	0	0	0	0	0	0	0	12
Idaho:											
Boise	0	------	0	0	2	0	0	0	0	0	14
Colorado:											
Colorado Springs	0	------	0	0	1	1	0	2	0	1	15
Denver	2	------	0	48	6	6	0	4	0	24	83
Pueblo	0	------	0	0	0	1	0	0	1	0	5
New Mexico:											
Albuquerque	0	------	0	0	1	2	0	2	0	1	7
Utah:											
Salt Lake City	0	------	0	58	1	6	0	2	0	8	40
Washington:											
Seattle	0	------	0	15	2	2	0	4	0	17	77
Spokane	0	------	0	34	2	0	0	0	0	6	20
Tacoma	0	------	0	0	0	0	0	1	0	4	22
Oregon:											
Portland	2	------	0	3	4	6	0	2	0	4	80
Salem	0	------	------	1	------	0	1	------	0	3	------
California:											
Los Angeles	6	2	0	10	16	19	1	18	0	55	332
Sacramento	1	------	0	11	0	9	0	1	0	10	27
San Francisco	2	2	1	7	1	6	0	8	1	44	171

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
New York:			
New York	1	0	1
Pennsylvania:			
Pittsburgh	3	0	0
Ohio:			
Cincinnati	0	0	1
Indiana:			
Indianapolis	1	0	0
Illinois:			
Chicago	1	1	0
Minnesota:			
Minneapolis	1	0	0
St. Paul	1	0	0
Iowa:			
Des Moines	1	0	0
Nebraska:			
Omaha	0	0	1
Maryland:			
Baltimore	1	1	0
District of Columbia:			
Washington	1	2	0
North Carolina:			
Wilmington	1	0	0

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Kentucky:			
Louisville	1	0	1
Tennessee:			
Knoxville	0	1	0
Memphis	0	0	4
Nashville	0	0	1
Alabama:			
Birmingham	3	0	0
Montgomery	0	0	1
Arkansas:			
Little Rock	0	0	2
Oklahoma:			
Muskogee	1	0	0
Oklahoma City	0	0	2
Texas:			
Houston	1	0	0
San Antonio	0	0	1
Colorado:			
Denver	0	1	1
California:			
Los Angeles	1	0	2

Encephalitis, epidemic or lethargic.—Cases: Worcester, 1; New York, 2; St. Louis, 1; Spokane, 1.
Pellagra.—Cases: Philadelphia, 2; Winston-Salem, 1; Savannah, 4; Nashville, 2; Montgomery, 1.
Typhus fever.—Cases: New York, 1; Atlanta, 1; Savannah, 1; Birmingham, 1.

FOREIGN AND INSULAR

GREAT BRITAIN

England and Wales—Infectious diseases—13 weeks ended April 3, 1937.—During the 13 weeks ended April 3, 1937, certain infectious diseases were reported in England and Wales as follows:

Disease	Cases	Disease	Cases
Diphtheria	14,819	Puerperal pyrexia	1,687
Ophthalmia neonatorum	1,107	Scarlet fever	20,878
Pneumonia	27,181	Smallpox	3
Puerperal fever	539	Typhoid fever	525

England and Wales—Vital statistics—First quarter 1937.—During the quarter ended March 31, 1937, 145,490 live births and 163,700 deaths were registered in England and Wales. The following vital statistics are taken from the Quarterly Return of Births, Deaths, and Marriages, issued by the Registrar General of England and Wales and are provisional:

Birth and death rates in England and Wales, quarter ended Mar. 31, 1937

Annual rates per 1,000 population:		Annual rates per 1,000 population—Con.	
Live births	14.4	Diphtheria	.09
Stillbirths	.62	Influenza	1.55
Deaths, all causes	16.3	Measles	.02
Deaths under 1 year of age	[1] 73	Scarlet fever	.01
Deaths from:		Typhoid fever and paratyphoid fever	.00
Diarrhea and enteritis (under 2 years of age)	[1] 5.4	Violence	.55
		Whooping cough	.07

[1] Per 1,000 live births.

England and Wales—Vital statistics—Year 1936.—The following birth and death rates for England and Wales for the year 1936 have been published in the Quarterly Return of Births, Deaths, and Marriages issued by the Registrar General and are provisional:

	Rates per 1,000 population		Rates per 1,000 population
Live births	14.8	Deaths from—Continued.	
Stillbirths	.61	Influenza	0.15
Deaths, all causes	12.1	Measles	.07
Deaths under 1 year of age	[1] 59.00	Scarlet fever	.01
Deaths from:		Typhoid fever and paratyphoid fever	.01
Diarrhea and enteritis (under 2 years)	[1] 5.7	Violence	.55
Diphtheria	.08	Whooping cough	.05

[1] Per 1,000 live births.

IRISH FREE STATE

Vital statistics—First quarter 1937.—The following vital statistics for the Irish Free State for the quarter ended March 31, 1937, are taken from the Quarterly Return of Marriages, Births, and Deaths, issued by the Registrar General, and are provisional:

	Number	Rate per 1,000 population		Number	Rate per 1,000 population
Marriages	3,357	4.5	Deaths from—Continued.		
Births	13,569	18.4	Influenza	1,953	2.65
Total deaths	15,366	20.8	Measles	58	
Deaths under 1 year of age	1,240	[1] 91	Puerperal septicemia	22	[1] 1.62
Deaths from:			Scarlet fever	43	
Cancer	899	1.22	Tuberculosis (all forms)	1,024	1.39
Diarrhea and enteritis (under 2 years)	121		Typhoid fever	13	
Diphtheria	86		Whooping cough	125	

[1] Per 1,000 births.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for June 25, 1937, pp. 858–871. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued July 30, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Algeria—Algiers.—On July 7, 1937, one suspected case of plague was reported in Algiers, Algeria.

Hawaii Territory—Island of Hawaii—Hamakua District—Paauhau Sector.—A plague-infected rat was reported on July 8, 1937, in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory.

United States.—A report of plague infection in Idaho and Oregon appears on page 1018 of this issue of PUBLIC HEALTH REPORTS.

Yellow Fever

Gold Coast.—On July 3, 1937, one case of yellow fever was reported in Accra and two fatal cases of the same disease were reported in Mepom, Gold Coast.

Nigeria—Oyu Province—Ogbomosho.—On June 30, 1937, three cases of yellow fever with one death were reported in Ogbomosho, Oyu Province, Nigeria.

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UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

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Preventing the Spread of Yellow Fever Through Air Traffic
Prevalence and Prevention of Syphilis in the Coast Guard
Review of Recent Court Decisions on Milk Control (1934-37)

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 52 JULY 30, 1937 NO. 31

PREVENTING THE SPREAD OF YELLOW FEVER THROUGH AIR TRAFFIC

Ever since the discovery of the existence of jungle yellow fever, which, owing to its peculiar epidemiological characteristics, might almost be considered as a new pathological entity, the Pan American Sanitary Bureau has been devoting much time and attention to study of the disease with the desire to initiate such measures as would tend to prevent its international spread.

The disease has been proved to exist in Brazil, Paraguay, Bolivia, Peru, Ecuador, Colombia, and Venezuela, and further investigations may succeed in demonstrating its presence in still other countries and localities.

While the presence of jungle yellow fever in any country has constituted a potential menace to the country in which it exists, and to neighboring countries, especially in those instances where large river systems, such as the Amazon, the Parana, the Orinoco, and others, traverse several countries, so far, with the exception of several interior cities and towns in Brazil and one city in Bolivia, no urban outbreaks of yellow fever have occurred, in recent years, at least that could be attributed to the jungle virus.

However, owing to the opening of new means of communication such as automobile roads, airplane services, and new railroad constructions and extensions, in several of the countries where jungle yellow fever has been proved to exist, it would appear that the menace which has heretofore been considered a potential threat only is now being converted into a probable or possible danger.

With a view, then, of taking such steps to prevent the international spread of yellow fever as would seem to lie within the power and authority of the Pan American Sanitary Bureau under the terms of the Pan American Sanitary Code, the arrangement presented in the accompanying letter and certificate was entered into with the Pan American Airways System and will be extended to other international airplane systems in the Western Hemisphere just as rapidly as the traveling representatives of the Bureau can establish contact with them.

It is believed that the measures to be applied will afford protection against the international spread of yellow fever through the medium of airplane traffic, and that they constitute the maximum of pro-

ventive measures that present circumstances warrant insofar as air traffic is concerned.

The prevention of the international spread of yellow fever through other means of transportation such as automobiles, railroads, maritime and river steamers, and similar craft, and through other local means of transportation, would appear to constitute a problem which each country must work out for its own protection.

PAN AMERICAN AIRWAYS, INC.,
GENERAL OFFICES—CHRYSLER BUILDING,
New York City, July 12, 1937.

The DIRECTOR, PAN AMERICAN SANITARY BUREAU,
Pan American Union Building, Washington, D. C.

DEAR SIR: Pursuant to conference today between Dr. J. D. Long, your traveling representative, and several of the high executives of our companies, we are glad to advise you that the following measures will be put into effect throughout the Pan American Airways System, in connection with yellow-fever control:

1. All of our flying personnel will be vaccinated against yellow fever as rapidly as possible. Pursuant to the information given us by Dr. Long, we shall arrange to have the vaccination done in Rio de Janeiro and, for as long as available, at Cristobal, Canal Zone, and at Lima, Peru. Vaccination of flight personnel will also be carried out at Miami, Fla., during the next winter season (Dec. 21 to Mar. 21).
2. The form designated as "Certificate of Origin of Passenger" shown to us by Dr. Long, which we understand has been adopted as a Pan American Sanitary Bureau standard form, will be furnished by all of our traffic offices and agencies to each individual passenger embarking in one of our planes at any point north of 30° south latitude, irrespective of the direction that his voyage may take. The passengers will be requested to fill out the form promptly and accurately, as a document of first importance in connection with their proposed voyage. This procedure will be put into effect so soon as we have received from you a supply of the accepted form and distributed the same to our traffic offices.
3. Airplanes will be fumigated during the night with an efficient insecticide, such as the formula which has already been supplied to us by the United States Public Health Service, and will be opened in the morning prior to embarkation of passengers and thoroughly ventilated.

We take this occasion to express our appreciation of the helpful and cooperative attitude manifested by Dr. Long and to assure you that we shall do our best toward helping satisfactorily to resolve the important public health problems raised by the rapid development of international air transport.

Very truly yours,

PAN AMERICAN AIRWAYS, INC.
(Signed) GEORGE L. RIHL, *Vice President.*
PAN AMERICAN-GRACE AIRWAYS, INC.
(Signed) J. D. MACGREGOR, *Vice President.*

PAN AMERICAN SANITARY BUREAU Issuing agency________________
Place______________________
Date issued__________________

CERTIFICATE OF ORIGIN OF PASSENGER

(To be filled in by agency issuing airplane passage)

NOTE: This certificate is a personal one and should be retained by the passenger along with vaccination and health certificates.

Name of passenger____
Where does voyage begin?________________________ Date__________
Where does voyage end?__________________________ Date__________
Will voyage be direct, or will there be stopovers?___________________

Places of stopover	*Date of arrival*	*Date of departure*

Where does passenger reside when at home?_______________________
On what date did passenger arrive in city where he will embark?_____
Give localities visited or resided in for 6 days prior to embarkation:
1st day________________________ 4th day______________________
2d day________________________ 5th day______________________
3d day________________________ 6th day______________________

REMARKS: Persons who can present satisfactory evidence that they have had yellow fever, or who can present certificates of vaccination against yellow fever, will not need Certificate of Origin.

This form will not be required of international passengers originating south of 30° south latitude unless they make stopovers in the area north of this parallel in excess of 1 day while en route to their destination.

It may occur to some that the data that may be given in the Certificate of Origin of passengers may not always be exact. It will be noted that the passenger is required to account for himself, or herself, for the 6 days preceding embarkation at the airport. This period, plus the time consumed on the voyage, gives a fairly wide margin of safety. Also, as a rule, passengers arrive at the city where the airport from which they will leave is located, from 3 to 4 days prior to departure in order to obtain consular visas on their passports, obtain police permits to leave the country, etc., and to make reservations for their voyage.

In case of doubt as to the exactness of the data contained in the Certificate of Origin of any passenger, an examination of the dates when consular visas, police permits, etc., were obtained will furnish valuable collateral information.

In cases where passengers have come from actually infected localities, and the 6-day period of incubation since last possible exposure

has not been completed upon arrival at destination, in the discretion of the quarantine officer the passengers may be placed in open surveillance, observation, or detention as may be deemed safest and most expedient.

It should be noted that the Certificate of Origin of passengers is a personal document in the same manner as is a certificate of vaccination against smallpox and should not be taken up by quarantine authorities. It is always available for examination, however.

The Surgeon General of the United States Public Health Service will detail a specially trained medical officer of the Service to Cristobal, Canal Zone, and Lima, Peru, to vaccinate flying personnel. Later, the same officer will be sent to Miami, Fla., and Brownsville, Tex., just as soon as his work is completed in the Canal Zone and Peru, probably about the end of 1937, in order to complete the vaccination of the personnel engaged in flying in Mexico, Central America, and the Southern States of the United States, countries in which the presence of jungle yellow fever has not been proved.

The Rockefeller Institute of Medical Research in New York and its laboratory in Rio de Janeiro will supply all the vaccine that will be used.

A STUDY OF SYPHILIS IN THE COAST GUARD *

By H. McG. Robertson, *Medical Director, United States Public Health Service, Chief Medical Officer, U. S. Coast Guard*

Prior to January 1933 it was customary to enlist Coast Guard personnel without making a Wassermann test, unless the history and examination suggested it. An enlisted person was then in a temporary status for the first enlistment and could be dismissed if incapacity ensued. At the end of that period he was allowed to reenlist if physically fit, without a Wassermann test, and from that time on was in a permanent (regular) status in the Coast Guard. As a "regular" he was entitled to be retired on three-fourths pay when incapacitated from any condition not due to "vicious habits." Upon casual consideration it might be assumed that practically all syphilis is the result of what is called "vicious habits", innocently acquired syphilis being relatively rare. However, under the retirement law and the interpretations thereof (General Circular No. 40, P. H. S.) it has come about that 2 of every 5 persons who have tertiary syphilis are considered to have acquired the disease innocently. Thus a large number of persons with syphilis become eligible for retirement if disabled by this disease. The determination that a person with syphilis is not infected because of "vicious habits" is based upon three principal points: The first is a history of an extragenital sore without a genital scar, the second is the presence of syphilis in the

*Published by permission of the Commandant.

wife, and the third is the fact of "long service" without history of the disease and with absence of genital scar. This "long service" has been placed by the Navy at 4 years. In the Coast Guard it has been set at 5.

A review of the records at Coast Guard Headquarters reveals that, on March 15, 1937, there were approximately 100 persons in the Coast Guard with syphilis which was held not due to "vicious habits."

On September 29, 1932, Medical Director Allan J. McLaughlin was detailed as Chief Medical Officer of the Coast Guard. After a few months' study of the sickness and retirement situations he saw clearly the need for more careful selection of enlisted personnel. In January 1933 he recommended to the Commandant that more careful examination of the lungs be made, and that blood pressure readings and Wassermann tests be made obligatory in all examinations for temporary enlistments and for later enlistments in the regular service. At a somewhat later date the term of enlistment was changed by Headquarters from 2 to 3 years, and the temporary status was lengthened from 1 term of 2 years to 2 terms of 3 years. As a result of this change in the length of temporary status, mentally and physically defective persons can more readily be discovered and dropped from the service. Many of these would have become "regular" under a 2-year period of temporary service and under the less strict physical entrance examinations of former years. There can be little doubt that the measures instituted by Dr. McLaughlin must result in marked lessening of premature retirements. Having instituted the measures making for stricter enlistment examination, Dr. McLaughlin put into effect a policy whereby all Coast Guard personnel infected with syphilis should be under compulsory treatment until headquarters was notified in each case by the attending officer that further treatment was not indicated.

Prior to January 1933, a record was kept of the personnel infected with the venereal diseases, but no effort was made to make treatment compulsory and each patient was allowed to secure treatment as he desired, after having been informed of his condition. It had, however, long been customary to hospitalize personnel with primary syphilis, insofar as possible, for treatment and isolation until the initial lesion had healed. Presumably each primary patient was instructed as to the necessity for further treatment after hospitalization, and this was no doubt so in the cases of patients in whom latent syphilis was incidentally discovered. As stated, however, no follow-up system was in practice prior to 1933. Early in that year the following system was inaugurated in order to insure adequate treatment of syphilitic personnel:

Medical officers of the Public Health Service, upon making a diagnosis of syphilis in a Coast Guard patient, are required (Hospital

Division Similar Letter No. 228, Dec. 9, 1932) to submit to Headquarters, under remarks, on C. G. Form 2522 (Final Medical Certificate), an outline of the treatment to be administered in the immediately ensuing course, specifying date and nature of each treatment advised. In case of failure to receive the outline of treatment, a letter is addressed by Headquarters to the medical officer concerned asking that it be furnished without delay. Upon receipt of the suggested course of treatment, the Medical Section at Coast Guard Headquarters sends a letter to the commanding officer of the unit to which the patient is attached directing him to send the patient in question to the Public Health Service for treatment on the first date specified in the outline. A similar letter is sent to the commanding officer prior to each of the dates on the indicated outline. A copy of each treatment letter is sent to the medical officer treating the patient, with a report card upon which the medical officer indicates by a check mark whether the patient did or did not report for treatment. If the patient fails to report, the matter is looked into and corrected. Upon receipt of the report card at headquarters properly checked, a record is made of the treatment upon the register of the patient. This reporting by card covers only outpatient treatments. The nature and number of treatments given to those receiving inpatient treatment are not reported to Coast Guard Headquarters. This follow-up system entails a large amount of clerical work, but the records show gratifying results in the relatively adequate treatment obtained in the great majority of cases.

The files in the Medical Section at Coast Guard Headquarters on March 15, 1937, contained the records of 788 persons who, since January 1, 1933, had come under the compulsory treatment plan instituted about that time by Medical Director McLaughlin. There is much valuable material in these records, and an effort has been made to sift out and present as many as possible of the more interesting facts and figures.

Of these 788 persons, 386 are no longer in the service, while 402 remain (20 retired and 382 on active duty).

Of the 386 out of the service, 6 have died. Nearly all of the remaining 380 were in a temporary status and were refused reenlistment at the expiration of their first or second temporary period. A few were in regular status and left the service through desertion or dismissal for cause. Of the 6 syphilitic persons who have died in the service since January 1, 1933, only 1 died as a result of syphilis. This was a patient who had received considerable treatment following a positive Wassermann found on the annual physical examination. It was impossible to reverse the Wassermann from 4+ in this case; and, while resting from treatment for a period of three months, the patient was seized with convulsive attacks which continued for several days. Lobar pneumonia supervened and death occurred on the tenth day.

The pneumonia was given as the actual or primary cause of death, but it seems that this 1 out of 6 deaths among 788 cases over a period of 4 years is really to be attributed to syphilis.

Of the 380 others now out of the Coast Guard as a result of having been refused reenlistment, 207 were primary cases and 173 secondary or tertiary (largely reported as tertiary). It is, of course, not known whether any of this number have died of syphilis since their separation from the Coast Guard. They were all in their twenties or early thirties, and in nearly all cases had received considerable treatment. For these reasons it is doubtful whether any of them have died of syphilis.

It may be said here that an enlisted man in temporary status who is found to have syphilis is very rarely dismissed at that time, unless he has less than 1 year's service. He is placed under treatment and directed to continue same until the expiration of his enlistment or until advised that further treatment is unnecessary. When discharged, he is advised that further treatments may be continued at Public Health Service hospitals and relief stations if application is made for same within 3 days from date of discharge, in accordance with the Regulations.

Of the 402 syphilitic personnel still in the Coast Guard, 20 are retired, 182 have completed treatment, and 200 are still receiving treatment. Of the 20 retired persons who are infected with syphilis, 8 are definitely retired because of this disease, 8 definitely for other causes, and 4 are retired for the following causes: 1 optic atrophy, 1 traumatic psychosis, and 2 for bronchial asthma. It is possible that syphilis is a factor in these last 4 cases.

Of the 8 definitely retired because of syphilis, 1 had the primary lesion in March 1932, developed paresis in 1935, and was retired in June 1936. Headquarters has a record of 25 injections of neosalvarsan and 14 of bismuth given this man as an outpatient in 1934. In 1932, immediately following the discovery of the initial lesion, he received 7 weeks' hospital treatment. This is a case in which the man's wife was found to have syphilis and retirement was allowed on the ground that the disease was not due to "vicious habits." The remaining 7 were old tertiary cases.

Of the 182 persons now in the service who have received treatment until advised to discontinue, 84 were primary cases and 98 secondary or tertiary (largely the latter). Thirteen of the primary cases and one of the tertiary are in a temporary status and will be in the Coast Guard only until the expiration of their current enlistments. Seventy-one primary and ninety-seven tertiary are in regular status and will no doubt remain in the Coast Guard.

Regarding the "vicious habits" or misconduct status of the 182 persons now under consideration, all of the primary cases come under

this heading except 5 which were extragenital-lip-chancres. Of the 98 tertiary cases, 59 are in the misconduct status and 39 are not. These 39, together with the 5 who had extragenital lesions, are eligible for retirement if disabled by syphilis. The remainder of the 182, that is 138, persons in this group may not be retired if at any time in the future they become disabled because of syphilis.

In addition to the 2 groups of cases above-mentioned, there is another composed of 200 persons who are still receiving treatment for syphilis. Of this number, 54 are primary cases and 146 secondary and tertiary—largely the latter. Of the primary cases, 53 are the result of so-called "vicious habits", while in 1, a lip chancre, the disease is listed as innocently acquired. Of these primary cases, 35 are in the regular establishment and 19 are in a temporary status and will be discharged at the end of their enlistments. Of the 146 cases listed as tertiary and secondary, 131 are regular and 15 are temporary. There are, thus, in this group now being treated, 166 persons in the regular Coast Guard service. These will no doubt in large part remain in the service and, with the group of 168 regulars who have completed their treatment, make a total of 334 persons whose future histories may be studied from time to time.

Of much interest is the incidence of syphilis in the two branches of the Coast Guard Service—the Life Saving and the Sea Service branches. On January 1, 1937, the enlisted strength of the Coast Guard on active duty was approximately 8,900. These were divided as follows:

Sea Service	6,485
Life Saving Service	2,415

The known number of persons in the Service at that time who had syphilis was 382. Of this number there were 372 in the Sea Service (5.7 percent of enlisted strength of that service), and 10 in the Life Saving Service (0.4 percent of the number in that service).

Reference to the files of those who, since January 1, 1933, have been treated but are no longer in the Coast Guard (386), shows almost the same relative numbers. Out of a total of 386 cases only 10 were in persons who served in the Life Saving branch of the Coast Guard. Of the 10 persons now in the Life Saving branch of the Service who have syphilis, 3 are tertiary cases at the same station on the outskirts of a large northeastern city, 2 are primary cases in and near 2 of the large Middle Atlantic cities, and of the remaining 5 cases (tertiary cases), 2 are on the Pacific Coast, 2 on the Great Lakes, and 1 is on the South Atlantic Coast.

This interesting finding seems to express the result of two distinctly different modes of life, if nothing else. The enlisted personnel of the Life Saving Service, to a great degree, spend their entire lives in or near the neighborhoods in which they were born and in which their

stations are located. They marry, lead normal home lives, and are not subject to distant travel orders except in unusual circumstances. The members of the Sea Service branch, the sailors, have no settled homes and must travel with their vessels to various seaports of the world, the newly enlisted men all being unmarried; or they serve on harbor boats in and near the large cities of the United States and its possessions. While the manner of life and the situations of the two service branches are as stated, it must be remembered that, under modern methods of transportation, no locality, on the Atlantic coast at least, is very remote from centers of population and of vice. With this in mind it is probable that other factors than environment have contributed to the marked differences in the incidence of syphilis as noted above. Only one case of syphilis of the central nervous system has developed in the Life Saving Service.

Figures are available in this study to show the number of primary cases of syphilis reported in each year since 1931. These figures are as follows:

Year	Cases
1932	33
1933	25
1934	37
1935	21
1936	30

Of 138 primary cases still in the Service and 20 recently discharged—a total of 158, the month in which the disease was acquired has been noted. These cases are seasonally distributed as follows:

January	17
February	9
March	10
April	13
May	9
June	11
July	19
August	18
September	14
October	13
November	11
December	15

Reference to rating and color reveals nothing of especial interest. Except in what may be termed the "steward's department", colored persons are not numerous. In the steward section of the Sea Service branch, there are 364 Filipinos and 99 Negroes out of a total of 757. This group presents 37 cases of known syphilis, or 4.9 percent. Among the seamen the percentage is 5.2, while the firemen show 7.7, and the remainder of the personnel 6.9 percent.

Reference to the matter of the late manifestations of syphilis, especially to syphilis of the central nervous system, shows the following:

Retired for central nervous system disease—definite	[1] 9
Retired for central nervous system disease—probable	1
Died from cerebral syphilis	1
To be discharged soon (misconduct status):	
Central nervous system disease and cirrhosis of the liver	1
Syphilitic aortitis	1
Under observation for syphilis of the central nervous system, but still on duty	8
Total	21

[1] 1 has been retired since these figures were compiled.

There are here 20 patients who have, or had, syphilis of the central nervous system and one with syphilis of the vascular system. Of the 20 with syphilis of the central nervous system, 1 is retired for tabes and 1 is under observation for this condition. Possibly some of the 8 under observation may not be confirmed, but this seems unlikely from available records. Accepting the 20 cases as all genuine, there is this number of cases of syphilis of the central nervous system in a total of 788, which is 2.5 percent. Jelliffe and White[1] state that "about 2 percent of those infected with syphilis develop paresis" and "less than one-half percent develop tabes." The Coast Guard patients seem to run fairly true to form, and this in spite of the fact that much treatment was administered in the late stages of the disease. Somewhere in the Public Health Service files there may possibly be found a record of earlier medication in these cases, but this is not available at Coast Guard Headquarters.[2]

The 20 cases of late syphilis here considered date back, with 2 exceptions, well into the last decade and must express the results of the methods of treatment then practiced. It is hoped that the intensive compulsory treatments received since January 1, 1933, by the 228 tertiary cases, now in the regular service, may reduce the incidence of late symptoms in this group. It should be interesting to observe them through the years. Certainly there is ground for hope that the late manifestations of syphilis may be entirely absent in that other group of regulars (106 in number) who were adequately treated immediately following the appearance of the primary lesions. The results here will be equally interesting and as easily followed.

The ages of the 106 "regulars" who have been and are now being treated for syphilis following primary lesions are as follows:

[1] Jelliffe, Smith Ely, and White, W. A.: Diseases of the nervous system; a textbook of neurology and psychiatry, 5th ed., p. 817. Lea & Febiger. 1929.

[2] For earlier published reports, see articles by Medical Director W. W. King, Public Health Reports, Vol. 45, No. 49, p. 2979 (1930), Vol. 46, No. 23, p. 1360 (1931), and Venereal Disease Information, Vol. 9, No. 1, p. 1 (1928).

Less than 25 years	2
25 to 29 years	47
30 to 34 years	35
35 to 39 years	17
40 to 43 years	5

These high ages are due to the fact that the younger men appearing with primary lesions within the past 4 years have been in temporary status and have been dismissed. The recorded treatments (outpatient) as shown in Headquarters' files in 71 of these 106 persons who have completed treatment are as follows:

Number of neosalvarsan injections

40 or more given in 10 cases.
31 to 40 given in 9 cases.
20 to 30 given in 21 cases.
15 to 19 given in 6 cases.
12 to 14 given in 8 cases.
11 or less given in 8 cases.
Not recorded, 9 cases.

Of those listed as not recorded, three were hospitalized for a period of from 10 to 12 weeks, while 6 were treated in the years before a record of outpatient treatments was kept at headquarters. Of the 16 patients receiving less than 15 injections of neosalvarsan, all spent from 10 days to 10 weeks in hospitals following the discovery of the initial sore. Some of these patients were in Alaska, Honolulu, and Puerto Rico, making it difficult to get a record of all treatments; yet in each case the medical officer attending has notified headquarters that no further treatments are indicated.

The bismuth treatments correspond closely to the arsenicals, while mercury was used in several cases.

It may be too early to expect definite benefits from the requirement that applicants for enlistment present a negative Wassermann report; yet it is significant that, since inaugurating this procedure on January 1, 1933, only 2 persons among the large number enlisted since that date have been found to have tertiary syphilis. Three others who originally presented a negative Wassermann are under treatment for secondary syphilis. Except for these 5 cases, all syphilis in personnel enlisted since January 1, 1933, has been primary upon first report. Should this low incidence of secondary and tertiary cases among recently enlisted personnel continue, and the average of new primary cases—about 30 per year for the past 5 years—be maintained, there should be a marked decrease, within the next few years, in the number of cases under treatment at any one time. The present number, 200, should be reduced to 100 or below.

The most interesting fact in this report is that a body of 334 persons in regular status in a military service may be kept under observation for as long a period as may be desired. There are, no doubt, other

groups of such "adequately" treated syphilitics, but it is doubtful that they may be so easily kept in sight or that their exact medical histories may be so readily obtainable as will be the case in this group of 334 and the future additions thereto.

RECENT COURT DECISIONS ON MILK CONTROL (1934–37)*

By JAMES A. TOBEY, LL. B., Dr. P. H., *Director of Health Service, The Borden Co., New York; Member of the New York Bar*

The sanitary control of market milk always has been and continues to be one of the more or less acute problems of public health administration. To be sure, great advances have been made in recent years in the production and handling of clean and safe milk, especially in our larger cities; but many milk supplies in smaller communities and rural regions are still in need of drastic improvement.

The problem of milk sanitation is less serious now than formerly, because all progressive members of the dairy industry appreciate the commercial advantages, as well as the humanitarian values, of pure, pasteurized milk. Not only are modern dairymen willing and eager to cooperate with local health officers whose actions are reasonably calculated to promote the public health, but national organizations of milk dealers have taken the initiative in making available to the industry and to the public health profession useful information on the technical and legal aspects of milk control.[1]

Although the quality of our market milks is steadily improving, much attention is and must be given to this important matter by legislative bodies, by executive health authorities, and, when the necessity arises, by the courts. As one of the coordinate branches in our American system of government, the judiciary is vested with the duty of determining proper legal principles, and of applying constitutional safeguards in the interests of justice and for the protection of the rights of individual citizens.

During the past 10 years, reports on the various legal aspects of milk control brought out by the decisions of the courts of last resort in this country have been submitted to this conference at intervals of every 2 or 3 years.[2] Since the last report, in 1934, the courts have been

*Read before the Conference of State and Provincial Health Authorities of North America, Washington, D. C., Apr. 5, 1937

[1] Tobey, J. A.: Legal aspects of milk control. Int Assoc. of Milk Dealers. Chicago. 1936.

[2] Tobey, J. A.: Court decisions on pasteurization. Pub. Health Rep., 42: 1756–1760 (1927). (Reprint No. 1168.)

Tobey, J. A.: Recent court decisions on milk. Pub. Health Bull. No. 191. U. S. Pub. Health Service. 1929.

Tobey, J. A.: Recent court decisions on milk. Pub. Health Rep., 47: 2250–2256 (1932). (Reprint No. 1555.)

Tobey, J. A.: Recent court decisions on milk. Pub. Health Rep., 49: 993–998 (1934). (Reprint No. 1644).

called upon to rule upon a number of important matters concerned with the production, inspection, licensing, processing, handling, and economic control of milk and milk products. Inasmuch as these decisions are now a part of American jurisprudence, health officials should be familiar with them.

PASTEURIZATION

Between 1914 and 1934, courts in 10 States sustained the validity of laws, ordinances, and regulations requiring the pasteurization of all or part of the market milk supply in accordance with methods approved by health authorities.[3] Except in one or two instances where such requirements have been declared void merely because of legal technicalities, the only decision adverse to pasteurization was in a Missouri case, in which it was held from the evidence submitted that raw milk is better than pasteurized milk.[4]

Since 1934 there has been only one recorded decision on pasteurization, although several unreported cases have been decided by courts of intermediate jurisdiction. Late in 1935 a municipal ordinance prohibiting the sale of pasteurized milk in a city unless it had been pasteurized within the city limits was upheld as a valid exercise of the police power by a district court of appeal in California.[5]

In deciding this case, in which an ordinance was claimed to be unreasonable and oppressive, the court had as a precedent an opinion by another district court of appeals in this State, which in 1929 had sustained a similar ordinance of the city of San Francisco.[6] Although the same requirement has been upheld by the New York courts,[7] this legal principle does not hold good in Minnesota, where it was more logically decided in 1933 that such a provision is invalid as an unconstitutional interference with a milk dealer's legitimate rights of property and contract.[8]

CONTROL OF BOVINE TUBERCULOSIS

Since 1896, legislation in various States requiring the tuberculin testing of dairy cattle and providing for the eradication of bovine tuberculosis has been approved by numerous courts.[9] Not until 1934, however, were the courts in Illinois called upon to rule upon this matter; but in that year the Bovine Eradication Act of 1929 of that State was upheld in three noteworthy decisions, in which it was

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[3] Tobey, J. A.: Pasteurization and the courts. New Eng. J. Med., 212. 613 (Apr. 4, 1935.)

[4] *State* v. *Kinsey* (1926). 314 Mo. 80, 282 S. W. 437.

[5] *La Franchi* v. *City of Santa Rosa* (Calif., 1935), 52 P. (2d) 558.

[6] *Witt* v. *Klimm* (1929), 97 Cal. App. 13, 274 P. 1039.

[7] *Lang's Creamery* v. *Niagara Falls* (1928), 231 N. Y. S. 368, 224 App. Div. 483, aff. in 251 N. Y. 343, 167 N. E. 464.

[8] *State* v. *City of Minneapolis* (1933), 190 Minn. 138, 251 N. W. 121.

[9] Tobey, J. A.: Legal aspects of milk control. Int. Assoc. of Milk Dealers. Chicago. 1936. Chap. VII, pp. 54–63.

stated that rebellious dairymen must submit to tuberculin testing of their cattle in the interests of the public health.[10]

Where, however, a State secretary of agriculture attempted to enforce compulsory tuberculin testing of all cattle in the absence of specific legislation authorizing such action, it was held by the South Dakota Supreme Court in 1936 that the secretary would be enjoined from enforcing a regulation to this effect.[11] This decision is not, of course, adverse to the cause of tuberculin testing, for the court pointed out that mandatory legislation of this character was proper, but that the court could not supply in the law what the legislature had neglected to provide.

UNDULANT FEVER

Although many court decisions on the control of bovine tuberculosis are on record, there have been only two or three on the subject of the control of Bang's disease in cattle. In 1932 the United States Supreme Court upheld as valid an order of the New York Commissioner of Agriculture and Markets requiring that all cattle imported into the State be free from Bang's disease, as shown by a certificate from the chief livestock sanitary official of their State of origin.[12]

The question of the liability of a milk dealer for a case of human undulant fever caused by his milk supply came before the Supreme Court of Appeals of Virginia in an interesting case decided in 1936.[13] Although this tribunal affirmed a judgment for the defendant milk dealer on the technical grounds that the action for negligence had not been brought within 1 year as required by the statute of limitations, and that the minor child who was afflicted was not a party to the contract of sale, the court laid down the doctrine that there is an implied warranty of the wholesomeness of a food sold by a dealer for immediate domestic use. A dairy company therefore warrants that his milk supply is free from the germs causing undulant fever; and if the disease occurs, he is liable to the customer for damages. This is an action on a contract, but there may also be an action for the wrong, or tort, of negligence, especially where a third party such as a minor child of the purchaser of the milk is the victim.

LIMITING THE INSPECTION AREA

What limits may a health department put upon the area from which inspected milk and dairy products may be shipped into a city for sale therein? An answer to this question was given by the Supreme Court of Georgia in a recent decision.[14]

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[10] *People* v. *Anderson* (1934), 355 Ill. 289, 189 N. E. 338; *People* v. *Hule* (1934), 355 Ill. 412, 189 N. E. 346; *Witte* v. *McLaughlin* (1934), 355 Ill. 463, 189 N. E. 350.

[11] *Anderson* v. *Russell* (S. D. 1936), 268 N. W. 386.

[12] *Mintz* v. *Baldwin* (1932), 289 U. S. 346; 77 L. Ed. 1245; 53 S. Ct. 611.

[13] *Colonna* v. *Rosedale Dairy* (Va., 1936), 186 S. E. 94.

[14] *Wright* v. *Richmond County* (Ga., 1936), 186 S. E. 815.

In this case an ordinance of the city of Augusta prohibited the shipment of ice cream into the city if it came from an area outside of a 60-mile radius from the city limits. The ordinance also required that all milk used in the manufacture of the ice cream must conform to the terms of the Standard Milk Ordinance. The plaintiffs in the case had agreed to meet these sanitary requirements, but had contested the 60-mile inspection limit as a violation of the State constitution.

In denying an injunction against the enforcement of this ordinance, the court stated: "The regulation is not unreasonable, unlawful, or void under our laws and constitution, in view of the relation of milk and its products to the health and physical welfare of many citizens to whom the products referred to are part of their daily food, and whose health would be endangered if those products were not free from all infection."

Directly contrary to this case, however, is a recent decision of the United States District Court in Maryland, which had before it a similar regulation promulgated by the health commissioner of Baltimore.[15] This regulation prohibited the sale of cream for the manufacture of ice cream in the city when the cream was produced in dairies located in a zone more than 50 miles from the city limits, except that emergency shipments might be allowed under certain conditions.

The court said that such a regulation was invalid and unconstitutional because it was an unreasonable interference with a legitimate business and with a lawful article of commerce. The court pointed out that the health department could easily ascertain the sanitary quality of the cream, if not by its own inspection, by reports from other health officials or by laboratory examination. If the cream was below standard or dangerous to health, it could be excluded; but it could not be prohibited merely on the capricious ground of distance.

A somewhat similar case was adjudicated recently in Kentucky.[16] Here a provision in an ordinance of the city of Louisville to the effect that no milk plants constructed beyond the city limits after a certain date would be permitted to supply milk to the city, except with the special sanction of the health officer, was held by the court to be invalid as an improper delegation of power to the discretion of a ministerial officer. The court allowed a provision that future plants should be constructed in accordance with requirements specified by the health officer, but properly refused to uphold the exclusion of wholesome milk from beyond the city limits.

INSPECTION FEES

An ordinance of the city of Little Rock imposing on grade A dairymen an inspection fee of $1 for each cow milked, with a minimum of

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[15] *Miller* v. *Williams* (Md., 1935), 12 F. Supp. 236.

[16] *Grant* v. *Leavell* (1935), 259 Ky. 267, 82 S. W. (2d) 283.

$10, and on grade B dairymen a fee of $3 for the first cow, and 25 cents for each additional one, and on pasteurizing plants a flat inspection fee of $100, was held by the Supreme Court of Arkansas not to be an arbitrary or discriminatory classification of dairies.[17] In this instance the pasteurizing plants were all in the city, whereas the dairies were outside, grade A milk being sold direct to consumers, and grade B milk being sold to pasteurizing plants.

IMPROPER DENIAL OF A LICENSE

An illuminating decision regarding the rights of milk dealers in obtaining licenses and the limitation of the powers of a health department was handed down by the New Jersey Supreme Court early in 1935.[18] In this case the health authorities of the city of Perth Amboy had refused to grant a permit to a qualified dealer to sell milk merely for the alleged reasons that there was already an adequate supply of milk in the city, and that the health department did not wish the added burden and expense of further regulation and control of milk. These contentions were dismissed as improper by the court, which called attention to the fact that the milk business may be vested with a public interest, but that the control over it by health authorities must be reasonable, and not arbitrary or capricious, as in this case. Holding further, that the health department had no discretion in this instance, it was ordered to grant the license.

"It will serve no useful purpose", asserted the court, "to answer or further discuss the purported reason argued upon which the refusal is sought to be justified. Suffice it to say that the meager facts, relevant as to the occasion and history of the refusal, lead us to the conclusion that they are without substance. They are excuses rather than legal reasons. The city just took the position that it had enough milk dealers and that it had the situation 'well in hand.' Such a position is unreasonable; it is arbitrary, capricious and discriminatory. It unlawfully curtails prosecutor's [the dealer's] common law right to engage in a lawful business, notwithstanding that it has fully complied with the requirements of the State and city. This the city cannot lawfully do."

CONTAINERS FOR MILK

A State law providing for the registration of bottles and prohibiting the use of milk bottles by any person other than their rightful owners was sustained by the Supreme Court of Kansas in 1936, and an injunction was issued to restrain such improper use by independent dealers in the city of Wichita.[19]

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17 *Coleman* v. *Little Rock* (Ark., 1935), 88 S. W. (2d) 58.

18 *Sheffield Farms* v. *Seaman* (1935), 114 N. J. L. 455; 177 A. 372.

19 *Associated Dairies* v. *Fletcher* (1936), 143 Kans. 561; 56 P. (2d) 106. *Wichita Natural Milk Prod. Assoc.,* v. *Capp* (1936) 144 Kans. 238, 59 P. (2d) 29.

In North Carolina, on the other hand, a statute to prohibit the wrongful use of milk bottles and other containers was declared to be void by the Supreme Court of that State as a needless interference with property rights.[20] This law prohibited the use of milk containers for any purpose except milk, made unlawful the use of such property of another, and required the purchase of milk bottles only from wholesalers, stores, or dairymen. The intent of the law was laudable, but the mode of expression was defective, and so a defendant charged with having conveyed a sample of urine in a milk bottle to a laboratory was found not guilty.

PRICE FIXING OF MILK

Since 1932 the Federal Congress and the legislatures of 26 States have passed laws providing for the economic regulation of milk and dairy products. The Federal laws and their manner of enforcement have been held by the United States Supreme Court to be unconstitutional insofar as they affected and were enforced upon products not actually shipped in interstate commerce.

Some of the State laws have been declared to be invalid, generally because of unlawful delegation of legislative powers, but eight of these laws have been upheld by the highest State courts and two of them by the United States Supreme Court in decisions of general application, although in some instances particular methods of enforcement have been restrained.

This matter is of somewhat academic interest to health officials, who are concerned only with the sanitary production and the public health control of milk and dairy products, and who should not be concerned with the economic aspects of the dairy industry. While it seems now to be well settled that a State in the exercise of its police power may enact emergency legislation for the reasonable regulation of wholesale and retail prices of milk, this is accomplished not as a public health measure but in the interests of the general welfare.

A comprehensive study of Federal and State control of milk prices has recently been completed under the auspices of the International Association of Milk Dealers, and is printed as a supplement to its recently published volume on the legal aspects of milk control.[21]

MISCELLANEOUS

A city ordinance requiring that chocolate milk be manufactured from grade A whole milk, raw or pasteurized, containing 3.5 percent butterfat was upheld in 1935 by the Supreme Court of Florida.[22] Although the State law authorized chocolate milk with 2 percent

[20] *State* v. *Brockwell* (1936), —N. C.—; 183 S. E. 378.
[21] Tobey, J. A.: Federal and State control of milk prices. Int. Assoc. of Milk Dealers. Chicago. 1937.
[22] *Anderson* v. *Tampa* (1935), 121 Fla. 670; 164 So. 546.

butterfat, another provision of the act permitted cities to adopt more stringent standards. In this case there was a strong dissenting opinion, in which it was correctly pointed out that this absolute prohibition of a wholesome food, which could be properly labeled, was unreasonable and destructive of constitutional rights.

Filled-milk laws in several States have recently been declared to be unconstitutional by the courts for the same general reasons set forth in the dissenting opinion in this chocolate milk case.[23]

SUMMARY

In conclusion, the statement may be repeated that the courts apparently realize what scientists know, that pure milk is the most important food of man.[24] The judiciary continues to uphold all reasonable regulation of this most valuable food, but the courts are also zealous in safeguarding the constitutional rights of individuals and in imposing proper restraints upon ardent health officials whose activities transcend the legitimate protection of the public health and general welfare.

DEATHS DURING WEEK ENDED JULY 10, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 10, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	7,665	8,528
Average for 3 prior years	7,545	
Total deaths, first 27 weeks of year	249,153	246,855
Deaths under 1 year of age	556	543
Average for 3 prior years	491	
Deaths under 1 year of age, first 27 weeks of year	15,577	15,456
Data from industrial insurance companies		
Policies in force	70,043,901	68,562,192
Number of death claims	9,313	11,226
Death claims per 1,000 policies in force, annual rate	6.9	8.6
Death claims per 1,000 policies, first 27 weeks of year, annual rate	10.5	10.5

[23] *Carolene Prod Co* v. *Dept. of Agr* (Neb., 1936), 268 N W. 313. *Carolene Prod Co.* v. *Thompson* (1935), 276 Mich. 172; 267 N W. 608. A filled-milk law was, however, upheld by a lower court in Pennsylvania early in 1937.

[24] Tobey, J. A.: Judicial maxims on milk. Milk Dealer, July 1936. Also, Milk. The indispensable food. Olsen. 1933.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 17, 1937, and July 18, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 17, 1937	Week ended July 18, 1936	Week ended July 17, 1937	Week ended July 18, 1936	Week ended July 17, 1937	Week ended July 18, 1936	Week ended July 17, 1937	Week ended July 18, 1936
New England States:								
Maine	1				27	84	1	0
New Hampshire	1				6	1	0	0
Vermont	1				6	13	0	0
Massachusetts	3	9			217	273	2	1
Rhode Island		3			6	13	0	0
Connecticut	11		1		51	41	0	0
Middle Atlantic States								
New York	25	37	[1] 5	[1] 5	615	660	18	4
New Jersey	4	19		7	247	171	1	5
Pennsylvania	17	36			480	277	7	2
East North Central States:								
Ohio [2]	10	15	4	8	749	250	5	6
Indiana	6	8	3	15	78	1	1	2
Illinois	21	15	7	4	299	16	4	8
Michigan	24	11		1	137	35	1	1
Wisconsin	7		4	16	45	72	0	0
West North Central States:								
Minnesota		5			11	25	1	0
Iowa [2]	2	6			15	2	0	1
Missouri	14	10	32	11	83	10	4	1
North Dakota	1			1		2	1	0
South Dakota					2	1	0	0
Nebraska	1	5			8	2	0	0
Kansas	2	2	2		6	7	1	1
South Atlantic States:								
Delaware					2	3	0	0
Maryland [3 4]	4	6	2	3	31	129	5	2
District of Columbia	8	3			33	32	0	3
Virginia [2]	6	6			55	36	5	4
West Virginia	11	3	7	4	45	4	1	8
North Carolina [3 4]	9	11			86	6	4	3
South Carolina [4]		3	40	23	8	2	1	0
Georgia [4]	2	7					1	1
Florida [4]	4			1	8	7	0	3
East South Central States:								
Kentucky	7	1	2		109	7	1	12
Tennessee	9	1	4	56	57	18	2	2
Alabama [4]	4	13	0	2	10	1	0	2
Mississippi [3 4]	11	1					4	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 17, 1937, and July 18, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 17, 1937	Week ended July 18, 1936	Week ended July 17, 1937	Week ended July 18, 1936	Week ended July 17, 1937	Week ended July 18, 1936	Week ended July 17, 1937	Week ended July 18, 1936
West South Central States:								
Arkansas	6	4	4	2	6		3	0
Louisiana	4	9	22	18	3	1	2	2
Oklahoma [4]	5	10	7	6	14	2	1	1
Texas [4]	32	21	37	30	151	55	3	0
Mountain States:								
Montana [2]	1				8	2	0	0
Idaho			1		8	12	0	1
Wyoming [2, 6]					1	6	0	0
Colorado [2]	3	3			38	9	0	0
New Mexico		1		3	19	4	0	1
Arizona	7	1	9	6	5	24	0	1
Utah [2]					32	23	0	0
Pacific States:								
Washington	5				42	36	0	0
Oregon		2	4	10	5	5	0	0
California	18	23	8	11	48	296	4	6
Total	307	310	214	238	3,912	2,685	79	84
First 28 weeks of year	12,244	13,295	273,324	139,195	233,030	262,425	3,871	5,569

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 17, 1937	Week ended July 18, 1936	Week ended July 17, 1937	Week ended July 18, 1936	Week ended July 17, 1937	Week ended July 18, 1936	Week ended July 17, 1937	Week ended July 18, 1936
New England States:								
Maine	0	4	2	4	0	0	0	1
New Hampshire	1	0	4	1	0	0	0	0
Vermont	1	2		3	0	0	0	0
Massachusetts	2	3	58	54	0	0	3	20
Rhode Island	0	0	9	9	0	0	0	0
Connecticut	0	1	10	7	0	0	0	1
Middle Atlantic States:								
New York	10	4	155	155	0	0	14	11
New Jersey	1	0	26	40	0	0	8	6
Pennsylvania	1	1	199	179	0	0	14	6
East North Central States:								
Ohio [2]	14	2	120	118	1	3	17	20
Indiana	8	1	18	22	4	0	10	9
Illinois	8	2	83	109	11	19	23	10
Michigan	2	0	199	86	0	0	3	9
Wisconsin	0	0	66	86	5	5	1	0
West North Central States:								
Minnesota	1	0	31	46	7	0	0	1
Iowa [2]	1	1	19	20	13	9	1	0
Missouri	4	0	53	35	5	3	37	17
North Dakota	0	0	14	7	8	0	0	2
South Dakota	0	0	7	8	0	3	0	1
Nebraska	4	0	7	20	0	6	1	1
Kansas	4	0	35	55	3	0	6	5
South Atlantic States:								
Delaware	0	0			0	0	2	1
Maryland [2, 4]	0	0	15	13	0	0	12	11
District of Columbia	0	0	4	3	0	0	4	2
Virginia [4]	3	2	7	13	0	0	18	15
West Virginia	2	0	23	25	0	0	9	8
North Carolina [2, 4]	8	2	17	11	0	1	25	16
South Carolina [4]	1	0	2	0	0	0	22	9
Georgia [4]	4	2	10	4	0	0	50	41
Florida [4]	0	0	3	5	0	0	1	1
East South Central States:								
Kentucky	5	2	11	8	0	0	50	14
Tennessee	7	30	4	5	0	0	48	33
Alabama [4]	1	35	5	9	0	0	15	16
Mississippi [2, 4]	20	12	3	3	0	0	18	14

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 17, 1937, and July 18, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 17, 1937	Week ended July 18, 1936	Week ended July 17, 1937	Week ended July 18, 1936	Week ended July 17, 1937	Week ended July 18, 1936	Week ended July 17, 1937	Week ended July 18, 1936
West South Central States:								
Arkansas	36	0	8	1	0	0	57	14
Louisiana	7	1	9		0	0	17	25
Oklahoma [5]	46	0	7	11	1	0	36	27
Texas [4]	52	1	30	31	0	1	40	46
Mountain States:								
Montana [2]	0	0	4	23	11	22	1	2
Idaho	0	0	10	6	9	2	0	1
Wyoming [2 6]	1	0		6	0	0	0	0
Colorado [2]	1	0	5	9	3	1	2	1
New Mexico	0	0	3	12	0	0	5	8
Arizona	0	1	2	3	0	0	4	2
Utah [3]	0	0	6	15	0	0	1	0
Pacific States:								
Washington	0	3	13	16	0	0	2	1
Oregon	0	0	11	7	3	2	4	3
California	19	7	64	86	7	1	15	7
Total	275	119	1,391	1,389	91	78	594	43
First 28 weeks of year	1,346	777	160,214	173,880	7,557	5,703	4,839	4,527

[1] New York City only.

[2] Rocky Mountain spotted fever, week ended July 17, 1937, 14 cases, as follows: Ohio, 1; Iowa, 1; Virginia, 2; North Carolina, 4; Montana, 3; Wyoming, 2; Colorado, 1.

[3] Week ended earlier than Saturday.

[4] Typhus fever, week ended July 17, 1937, 63 cases, as follows: Maryland, 2; North Carolina, 2; South Carolina, 4; Georgia, 33; Florida, 3; Alabama, 14; Mississippi, 1; Texas, 4.

[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa.

[6] Colorado tick fever, week ended July 17, 1937, Wyoming, 3 cases.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May 1937										
Arizona	2	13	132	3	387	1	0	41	0	10
June 1937										
Arizona		12	84	3	162	2	1	36	0	15
California	17	157	2,375	14	1,239	10	34	764	75	37
Colorado	3	15			167			76	6	8
Florida	6	44	8	91	57		1	15	0	8
Michigan	8	75	2	6	1,112		5	2,300	16	17
Minnesota	1	18	5	3	24		1	390	58	3
Mississippi	3	16	608	6,669	849	581	100	16	0	48
Nebraska					62		3	103	13	2
New Jersey	11	32	16	1	3,962		3	363	0	6
Ohio	11	52	35	2	5,574	1	8	661	23	30
Pennsylvania	40	95		2	6,496		2	1,927	0	38
South Carolina		112	256	1,230	239	227	4	8	0	60

Summary of monthly reports from States—Continued

May 1937

Arizona:	Cases
Chicken pox	123
Dysentery	61
German measles	26
Mumps	83
Trachoma	32
Undulant fever	5
Whooping cough	65

June 1937

	Cases
Actinomycosis:	
California	1
Minnesota	1
Beriberi:	
California	1
Chicken pox:	
Arizona	44
California	2,990
Colorado	112
Florida	16
Michigan	1,425
Minnesota	573
Mississippi	295
Nebraska	64
New Jersey	1,178
Ohio	1,198
Pennsylvania	2,695
South Carolina	64
Dengue:	
California	1
Diarrhea:	
Ohio (under 2 years; enteritis included)	17
South Carolina	1,661
Dysentery:	
Arizona	269
California (amoebic)	18
California (bacillary)	58
Florida (bacillary)	5
Michigan (bacillary)	3
Minnesota (amoebic)	2
Mississippi (amoebic)	201
Mississippi (bacillary)	2,941
Ohio (bacillary)	1
Encephalitis, epidemic or lethargic:	
California	4
Michigan	1
New Jersey	1
Ohio	3
Pennsylvania	4
South Carolina	1
Food poisoning:	
California	97
German measles:	
Arizona	18
California	114
Michigan	805

June 1937—Continued

German measles—Contd.	Cases
New Jersey	164
Ohio	39
Pennsylvania	829
South Carolina	1
Granuloma, coccidioidal:	
California	6
Hookworm disease:	
Mississippi	521
South Carolina	68
Impetigo contagiosa:	
Colorado	3
Jaundice, epidemic:	
California	5
Lead poisoning:	
Ohio	27
Leprosy:	
Michigan	1
Mumps:	
Arizona	40
California	2,123
Colorado	28
Florida	70
Michigan	1,515
Mississippi	569
Nebraska	13
New Jersey	650
Ohio	216
Pennsylvania	2,268
South Carolina	32
Ophthalmia neonatorum:	
California	1
Mississippi	5
New Jersey	10
Ohio	56
Pennsylvania	6
South Carolina	7
Paratyphoid fever:	
California	6
Florida	3
Michigan	3
New Jersey	2
Ohio	1
South Carolina	6
Puerperal septicemia:	
Colorado	1
Mississippi	30
Ohio	5
Rabies in animals:	
California	242
Michigan	7
Mississippi	22
New Jersey	7
South Carolina	33
Rabies in man:	
California	1
Pennsylvania	1

June 1937—Continued

	Cases
Rocky Mountain spotted fever:	
California	2
Colorado	7
New Jersey	2
South Carolina	1
Septic sore throat:	
Arizona	8
California	4
Colorado	2
Michigan	30
Minnesota	6
Ohio	108
Tetanus:	
California	5
Florida	1
Michigan	1
New Jersey	2
Ohio	2
South Carolina	1
Trachoma:	
Arizona	29
California	19
Mississippi	4
Trichinosis:	
California	1
Tularemia:	
California	2
Michigan	4
Minnesota	5
Typhus fever:	
Florida	19
New Jersey	1
South Carolina	3
Undulant fever:	
Arizona	1
California	18
Colorado	1
Michigan	6
Minnesota	8
New Jersey	4
Ohio	2
Pennsylvania	8
Vincent's infection:	
Colorado	2
Michigan	21
Whooping cough:	
Arizona	43
California	2,506
Colorado	115
Florida	65
Michigan	779
Minnesota	480
Mississippi	742
Nebraska	55
New Jersey	425
Ohio	1,389
Pennsylvania	1,656
South Carolina	205

PLAGUE INFECTION IN ORMSBY COUNTY, NEV.

Under date of July 16, 1937, plague infection was reported proved by animal inoculation and cultures in a lot of 10 fleas collected from 19 chipmunks, *Eutamias speciosus frater*, shot July 2, 1937, approximately 15 miles west of Carson City, Ormsby County, Nev.

DIAGNOSIS OF PLAGUE IN DOUGLAS COUNTY, NEV., CONFIRMED

The provisional diagnosis of plague reported on June 4, 1937, in a patient from Lake Tahoe, Douglas County, Nev.,[1] has been reported to have been confirmed on June 8.

[1] PUBLIC HEALTH REPORTS, June 25, 1937, p. 851.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 10, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	149	44	16	2,214	339	684	9	391	70	1,270	--------
Current week [1]	105	39	17	1,474	307	507	9	339	58	1,268	--------
Maine:											
Portland	0	------	0	2	1	0	0	0	0	1	14
New Hampshire:											
Concord	0	------	0	0	1	0	0	1	0	0	8
Manchester	0	------	0	0	1	0	0	1	0	0	12
Nashua	0	------	0	0	0	2	0	0	0	2	12
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	0	0	0	0	0	0	1	5
Rutland	0	------	0	0	0	0	0	0	0	0	6
Massachusetts:											
Boston	0	------	1	31	14	20	0	6	1	24	178
Fall River	0	------	0	7	1	0	0	1	0	0	23
Springfield	0	------	0	1	1	1	0	1	0	14	34
Worcester	0	------	0	0	3	2	0	6	0	9	50
Rhode Island:											
Pawtucket	0	------	0	0	0	1	0	0	0	0	17
Providence	0	------	0	15	2	14	0	1	0	21	53
Connecticut:											
Bridgeport	0	------	0	0	0	4	0	0	0	0	33
Hartford	0	------	0	18	4	2	0	0	0	0	42
New Haven	0	------	0	0	2	2	0	0	2	1	46
New York:											
Buffalo	0	------	0	33	5	8	0	3	0	31	126
New York	36	------	0	245	61	57	0	69	8	72	1,299
Rochester	0	1	0	7	3	1	0	1	1	17	71
Syracuse	0	------	0	18	3	8	0	1	1	14	55
New Jersey:											
Camden	0	1	1	2	1	2	0	1	0	5	30
Newark	0	------	0	9	1	2	0	6	0	23	85
Trenton	0	------	0	24	1	2	0	5	0	3	31
Pennsylvania:											
Philadelphia	1	2	2	6	13	41	0	22	4	40	392
Pittsburgh	1	------	2	173	14	14	0	8	2	33	184
Reading	0	------	0	10	1	0	0	3	0	1	28
Scranton	0	------	--------	1	------	0	0	------	0	0	--------
Ohio:											
Cincinnati	1	1	0	7	3	8	0	8	0	24	131
Cleveland	0	------	0	172	6	29	0	11	2	52	176
Columbus	0	1	1	3	0	0	0	1	0	5	64
Toledo	0	------	0	113	0	2	0	1	0	50	50
Indiana:											
Anderson	0	------	0	10	0	2	0	1	0	1	13
Fort Wayne	0	------	0	0	2	0	0	0	0	0	22
Indianapolis	1	------	2	31	7	0	1	5	1	23	95
Muncie	0	------	0	0	0	0	0	1	0	0	21
South Bend	0	------	0	0	1	3	0	1	1	1	24
Terre Haute	1	------	0	1	0	0	0	0	0	0	15
Illinois:											
Alton	0	------	0	0	0	0	0	0	0	0	6
Chicago	22	3	3	268	24	69	0	38	1	94	670
Elgin	0	------	0	0	1	0	0	0	0	4	15
Moline	0	------	0	1	0	0	2	0	0	9	6
Springfield	0	------	0	2	0	1	0	0	0	5	--------
Michigan:											
Detroit	12	------	0	89	13	74	0	16	0	56	264
Flint	1	------	0	0	4	5	0	0	0	6	27
Grand Rapids	0	------	0	13	0	5	0	0	0	41	21
Wisconsin:											
Kenosha	0	------	0	0	0	3	0	0	0	0	6
Madison	0	------	0	1	0	2	0	0	0	6	24
Milwaukee	0	------	0	17	2	18	0	4	0	29	87
Racine	0	------	0	2	0	8	0	0	0	3	9
Superior	0	------	0	0	0	1	0	0	0	3	6

[1] Figures for Barre, Vt., and Tacoma, Wash., estimated; reports not received.

City reports for week ended July 10, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Minnesota:											
Duluth	0		0	0	2	4	0	0	0	7	28
Minneapolis	1		0	0	3	8	0	1	0	5	81
St. Paul	0		0	1	4	0	0	2	0	87	43
Iowa:											
Cedar Rapids	0			0		0	0		0	3	
Davenport	0			0		1	0		0	2	
Des Moines	0		0	0	0	6	2	0	0	0	28
Sioux City	0			0		0	0		0	6	
Waterloo	0			2		4	0		0	0	
Missouri:											
Kansas City	1		0	2	2	4	0	5	0	5	96
St. Joseph	1		0	0	0	1	0	0	1	2	
St. Louis	2		0	31	4	17	0	9	1	27	187
North Dakota:											
Fargo	0		0	0	0	1	4	0	0	15	7
Grand Forks	0			0		0	0		0	0	
Minot	0		0	0	0	0	0	0	0	0	1
South Dakota:											
Aberdeen	0			0		0	0		0	0	
Sioux Falls	0		0	0	0	0	0	0	0	0	9
Nebraska:											
Omaha	0		0	0	2	1	1	2	1	3	54
Kansas:											
Lawrence	0		0	0	0	0	0	0	0	8	7
Topeka	0		0	0	1	3	0	0	0	18	
Wichita	0		0	1	3	2	0	0	1	7	27
Delaware:											
Wilmington	0		0	0	1	1	0	0	0	0	18
Maryland:											
Baltimore	1		0	12	9	6	0	9	1	64	170
Cumberland	0		0	0	0	0	0	0	0	0	12
Frederick	0		0	0	0	0	0	0	0	0	1
District of Columbia:											
Washington	3		0	34	9	2	0	7	4	10	149
Virginia:											
Lynchburg	1		0	3	0	0	0	0	0	7	10
Norfolk	0		0	9	1	1	0	2	0	0	23
Richmond	0		1	1	4	1	0	3	0	0	52
Roanoke	0		0	1	0	0	0	0	0	4	12
West Virginia:											
Charleston	0		0	0	1	0	0	0	1	0	26
Huntington	0			0		0	0		0	0	
Wheeling	0		0	3	2	4	0	1	0	9	24
North Carolina:											
Gastonia	0		0	0	0	0	0	0	0	3	
Raleigh	0		0	0	0	0	0	1	0	1	16
Wilmington	0		0	0	0	0	0	0	0	11	11
Winston-Salem	0		0	0	0	2	0	0	0	10	5
South Carolina:											
Charleston	0	23	0	0	2	0	0	0	3	0	10
Florence	0		0	0	0	0	0	0	0	0	10
Greenville	0		0	0	1	0	0	0	0	6	15
Georgia:											
Atlanta	0		0	0	6	2	0	6	1	8	98
Brunswick	0		0	0	0	0	0	0	0	0	4
Savannah	0	1	0	0	1	0	0	2	4	3	41
Florida:											
Miami	0		0	1	0	0	0	3	0	0	30
Tampa	0		0	0	0	0	0	1	0	0	16
Kentucky:											
Ashland	0		0	0	3	0	0	0	0	1	33
Covington	0		0	6	0	1	0	2	0	16	11
Lexington	0		0	6	2	0	0	3	1	18	22
Louisville	0	1	0	26	3	0	1	8	0	78	
Tennessee:											
Knoxville	0		0	0	1	0	0	2	1	1	24
Memphis	0		0	10	1	0	0	4	0	33	84
Nashville	0		0	9	4	2	0	1	1	14	42
Alabama:											
Birmingham	0		0	13	1	0	0	2	1	11	73
Mobile	0		0	0	0	0	0	2	0	0	31
Montgomery	0	1	0	0		0	0		2	0	
Arkansas:											
Fort Smith	0		0	0	0	0	0	0	0	0	
Little Rock	0		0	0	1	0	0	2	2	0	3
Louisiana:											
New Orleans	5	1	0	4	8	3	0	14	4	18	147
Shreveport	0		0	0	3	0	0	5	0	0	37

City reports for week ended July 10, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Oklahoma:											
Muskogee	0	------	0	0	0	0	0	0	0	0	-------
Oklahoma City	0	------	0	0	1	2	0	2	1	2	40
Tulsa	0	------	-------	7	-------	1	0	-------	0	8	-------
Texas:											
Dallas	1	------	0	3	0	2	0	1	2	33	68
Fort Worth	0	------	0	0	2	1	0	0	0	1	46
Galveston	0	------	0	0	1	0	0	0	0	0	6
Houston	4	------	0	1	4	2	0	3	1	4	77
San Antonio	0	------	0	0	5	0	0	3	0	1	66
Montana:											
Billings	0	------	0	0	1	0	0	0	0	0	5
Great Falls	0	------	0	0	0	0	0	0	0	6	4
Helena	0	------	0	1	0	2	0	0	0	0	1
Missoula	0	-----	0	0	0	0	0	0	0	0	3
Idaho:											
Boise	0	-----	0	0	0	0	0	0	0	3	5
Colorado:											
Colorado Springs	0	------	0	1	0	0	0	2	0	0	9
Denver	2	------	1	30	2	7	3	3	0	27	80
Pueblo	0	------	0	1	2	0	0	0	0	0	9
New Mexico:											
Albuquerque	0	------	0	2	1	0	0	1	2	0	13
Utah											
Salt Lake City	0	------	0	39	0	4	0	0	0	6	38
Washington:											
Seattle	1	------	1	14	2	1	0	4	2	44	74
Spokane	0	-----	0	29	1	2	0	0	0	8	24
Tacoma	-------	-------	-------	-----	-------	-------	-------	-------	-------	-------	-------
Oregon											
Portland	1	-----	0	0	2	0	2	5	0	3	60
Salem	0	2	-------	0	-------	0	0	-------	0	0	-------
California:											
Los Angeles	5	4	2	11	13	22	0	18	1	79	300
Sacramento	0	1	1	7	0	1	0	3	2	13	25
San Francisco	1	1	0	10	8	3	0	6	0	38	144

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	0	0	1
Rhode Island:			
Providence	1	0	0
Connecticut:			
New Haven	0	0	1
New York:			
Buffalo	1	0	0
New York	7	4	2
Rochester	0	0	1
Syracuse	1	1	0
Pennsylvania:			
Philadelphia	2	1	0
Pittsburgh	2	0	0
Ohio:			
Cincinnati	0	0	5
Cleveland	0	0	1
Illinois:			
Chicago	1	1	1
Michigan:			
Detroit	1	0	1
Missouri:			
St. Louis	1	0	1
West Virginia:			
Wheeling	0	0	1
Kentucky:			
Lexington	0	0	1
Louisville	0	0	1
Tennessee:			
Memphis	1	0	1
Alabama:			
Birmingham	0	0	1
Arkansas:			
Fort Smith	1	1	0
Little Rock	2	0	7
Louisiana:			
New Orleans	1	1	1
Shreveport	0	2	0
Oklahoma:			
Oklahoma City	0	0	2
Texas:			
Dallas	0	0	1
Fort Worth	0	0	4
Houston	2	0	3
San Antonio	0	0	1
Colorado:			
Denver	1	1	0
Pueblo	0	0	1
California:			
Los Angeles	1	1	3
San Francisco	1	0	0

Encephalitis, epidemic or lethargic.—Cases: Cleveland, 2; Washington, D. C., 1; Spokane, 1.

Pellagra.—Cases: Boston, 1; Washington, D. C., 1; Charleston, S. C., 2; Savannah, 2; Nashville, 1; New Orleans, 2; Dallas, 1.

Typhus fever.—Cases: New York, 1; Savannah, 2; Miami, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended July 3, 1937.—During the 2 weeks ended July 3, 1937, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis			2	1	6					9
Chicken pox		5	2	126	462	31	228	61	69	984
Diphtheria		2	6	51	17	3	1			80
Erysipelas				4	6	1	1	1	4	17
Influenza		2		5	1				3	11
Measles		64	5	355	1,004	241	273	207	139	2,288
Mumps		1			250	5	4	13	68	341
Paratyphoid fever					10					10
Pneumonia	4				7		5		13	29
Poliomyelitis				1	2	1				4
Scarlet fever		12	19	86	230	31	42	117	26	563
Smallpox								1		1
Trachoma					1	3				4
Tuberculosis	3	5	13	109	74	32	7	8	28	279
Typhoid fever			6	33	3		7	2	2	53
Undulant fever					5				1	6
Whooping cough		5		253	153	249	33	3	15	711

CUBA

Habana—Communicable diseases—4 weeks ended July 3, 1937.—During the 4 weeks ended July 3, 1937, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Cerebrospinal meningitis	1		Poliomyelitis	[1] 4	
Diphtheria	13		Scarlet fever	1	
Leprosy	1		Tuberculosis	24	2
Malaria	[1] 45	2	Typhoid fever	[1] 79	11

[1] Includes imported cases.

Provinces—Notifiable diseases—4 weeks ended June 26, 1937.—During the 4 weeks ended June 26, 1937, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1			11		2	14
Cerebrospinal meningitis		1					1
Chicken pox	2	2	1	2			7
Diphtheria	4	11		7	1	1	24
Dysentery				1			1
Hookworm disease		2				3	5
Leprosy		1					1
Malaria	75	42	8	108	56	307	596
Measles	1	2	4	1		2	10
Poliomyelitis	1	5		4		1	11
Scarlet fever		2					2
Tuberculosis	7	147	23	69	11	46	303
Typhoid fever	16	59	21	72	13	29	210
Yaws						3	3

VIRGIN ISLANDS

Notifiable diseases—April–June 1937.—During the months of April, May, and June 1937, cases of certain notifiable diseases were reported in the Virgin Islands as follows:

Disease	April	May	June	Disease	April	May	June
Dengue			30	Pellagra	3		1
Dysentery	1			Pneumonia	4	1	2
Filariasis		3		Schistosomiasis	2	1	
Gonorrhea	12	3	4	Syphilis	19	17	5
Hookworm disease	5	3	3	Tetanus	2		
Malaria	157	69	65	Tuberculosis	3	11	2

YUGOSLAVIA

Communicable diseases—4 weeks ended June 20, 1937.—During the 4 weeks ended June 20, 1937, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	37	2	Paratyphoid fever	39	1
Cerebrospinal meningitis	27	8	Poliomyelitis	7	3
Diphtheria	379	28	Scarlet fever	256	2
Dysentery	34	3	Sepsis	13	7
Erysipelas	238	5	Tetanus	55	24
Leprosy	2		Typhoid fever	209	26
Lethargic encephalitis	3		Typhus fever	108	9
Measles	364	3			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan-American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Nov. 29-Dec. 26, 1936	Dec. 27, 1936-Jan. 30, 1937	Jan. 31-Feb. 27, 1937	Feb. 28-Mar. 27, 1937	Week ended— April 1937 3	April 10	April 17	April 24	May 1937 1	May 8	May 15	May 22	May 29	June 1937 5	June 12	June 19	June 26
India	C	17,965	20,182	7,736	13,015	5,186	5,386	2,900	3,551	2,612	2,860	2,558	3,036	3,083				
	D	9,566	11,282	4,305	6,488	2,395	2,683	1,413	1,833	1,407	1,533	1,370	1,511	1,545				
Assam	C	664	585	197	394	236	402	446	739	706	554	503	481	310	253	104	49	24
	D	315	330	80	161	99	138	186	305	289	255	266	248	147	162	72	30	10
Bassein	C			8	37	8	9	21	48	46	34	12	4	1	2	3	1	
Bombay Presidency	C	2,367	646	253	98	35	132	164	226	256	613	687	871	832	583	451		
	D	1,467	249	142	84	13	57	76	91	121	282	333	346	370	209	183		
Bombay	C	2						[1] 1		[1] 1	[1] 1							
Calcutta	C	61	88	87	106	44	37	49	117	94	136	136	231	135	86	31	35	21
Central Provinces and Berar	C	567	125		4				5	5	17	23	21	17	50	97	123	48
Chittagong	C	11	3	2	3		1	6	6	[1] 1	16	32	43	51	21	7	6	
Madras Presidency	C	5,588	10,652	4,516	3,186		1,181	1,028	1,061		494	494	534	516				
	D	2,885	5,712	2,514	1,559		635	572	648		282	263	309	249				
Madras	C	60	75	25	5	2	2	1						1	3	2	1	
	D	21	41	14	1		1								1	2		
Negapatam	C	11	22	4	2							1		1	3			17
	D	7	13	1											2			10
Northwest Frontier Province	C	7																
Orissa Province	C	994	889	609	602		137	157	74	91	38	29	15	8		39	73	76
Punjab	C				1			1	1	2			1			3	6	7
Rangoon	C	2	1	4	3		2		4	4	4		1	3	[1] 1	[1] 4	1	1
Sind State	C											1						
Tuticorin	C	3								[1] 2					4	6		
India (French):																		
Chandernagor Territory	C	5	9		3	2	2	1		1			2	5	2			
Karikal Province	C	96	96	16	3													
Pondichery Province	C			13	1						1							
Indochina (see also table below): Cochinchina—																		
Chaudoc	C				P													
Cholon Province	C		1					P										
Vinlong	C	1																
Philippine Islands: Manila	C								1									
	D								1									

Siam:																		
Bangkok	C	2	150	163	226	125	167	305	351	178	84	33	23	20	13	9	4	2
Provinces	C	196	855	1,339	1,485	301	500	448	307	286	213	146	104	47	50	72	81	52
Straits Settlements: Penang	C																1	
On vessels:																		
S. S. *Kedah* at Singapore from Penang	C						1											
S. S. *Hellas* at Bangkok from Swatow	C							3										
	D							2										
S. S. *Kedah* at Belawan-Deli	C						1											
S. S. *Ellenga* at Penang from Negapatam	C														15			
	D														9			
S. S. *Aronda* at Rangoon from Calcutta	C														1			
S. S. *Badahur* at Rangoon from Calcutta	C															1		

Place		December 1936			January 1937			February 1937			March 1937			April 1937			May, 1-10, 1937
		1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31	1-10	11-20	21-30	
Indochina (French) (see also table above):																	
Cambodia [1]	C	1									2	6			2		3
	D	1									2	6			2		1
Cochinchina [3]	C		1				1				2				1		
	D		1				1				2				1		

[1] Imported.
[2] Includes 3 imported cases.
[3] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE[1]

[C indicates cases; D, deaths; P, present]

Place		Nov. 29–Dec 26, 1936	Dec. 27, 1936–Jan. 30, 1937	Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Week ended— April 1937 3	April 10	April 17	April 24	May 1937 1	May 8	May 15	May 22	May 29	June 1937 5	June 12	June 19	June 26
Algeria: Algiers[2]	C	[3] 1																
Argentina. (See table below.)																		
Bolivia. (See table below.)																		
Brazil (See table below.)																		
British East Africa:																		
Kenya	C	8	20	7	4		3		2			1	5	1		2	3	
Tanganyika	C			84	10	8	5	16		1	3	3	3	1	3	2	1	
Uganda	C	52	36	32	41	6	6	7	5	5	4	4	8	27	6	8	12	
	D	50	34	32	35	5	5	7	5	3	5	3	7	25	5	8	12	
Ceylon:																		
Central Province—Nuwara Eliya District	C															1		
Chilaw District	C													1				
Colombo	C	3	3	10	6					1			1		1		1	
	D	3	3	9	6					1			1		1		1	
Plague-infected rats		4	12	17	3		1		1	1					1	2		
China:																		
Amoy	C					1	[4] 1											
Fukien Province[5]	D					130												
Hainan Island	C				P													
Hsiatangchi[6]																		
Dutch East Indies:																		
Java and Madura	C	452	583	568	443	77	69											
	D	452	577	569	443	76	69											
Java—Batavia	C						[7] 1											
Ecuador (see also table below):																		
Babahoyo	C	2	3	1														
Guayaquil	C	13	17	26	33	5	4	7	1	5	3						4	
	D	13	11	11	24	5	4	6	1	2		1					1	2
Plague-infected rats		8	10	16	33	13	7	9	8	4	5	10	8		6	5	2	
Playas	C	11	1															
Egypt:																		
Asyut Province	C	2	2	1	2	16	18	10	4	7	1	1			1			
Dakahliya Province	C						1											
Girga Province	C				1	1				2		1						1
Formosa: Taihoku District	C	1																

Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua District:																		
Hamakua Mill Sector					1													
Kukaiau			1															
Paauhau Sector [8]		5	9	6	5		1	1	2	2		2					3	4
Pohakea					1													
India	C	3,029	5,118	4,931	5,980	1,368	1,787	1,639	1,300	1,039	527	467	296	173				
	D	1,099	2,006	2,528	2,976	762	946	926	833	659	362	309	233	127				
Bassein	C	1	3	7	5	1		2	5	2		4		1		3		3
Plague-infected rats				1	2		1	1				2				1	1	
Bombay Presidency	C	105	139	120	83	30	22	9	7	19	5	4	2	5	10	3		
	D	50	86	62	40	18	10	8	1	8	4	1	1	2	3	1		
Central Provinces and Berar	C	1,592	2,022	1,614	2,213	388	317	213	185	182	71	58	39	13			7	
Karachi	C			7	3	2		3		1								
Plague-infected rats									1									
Madras Presidency	C	131	97	94	97	30	16	5	2		8	1	8	6				
	D	80	55	57	54	16	8	6			4		6	2				
Punjab	C				1				1	1	1							
Rangoon	C		3	1	1	2	1			1			1					
Sind State	C			6	4	2	1	3		1		1						
Indochina (see also table below): Bentre	C		1															
Madagascar. (See table below)																		
Malta	C		6						1				1					
	D		1															
Plague-infected rats			1															
Northern Rhodesia	C		8	1														
Peru. (See table below.)																		
Senegal:																		
Dakar	C						1								1			
Thies	C											2			1		2	
Tivaouane	C									1								
Syria: Ras el Ain region	D														[9] 12			
Tunisia: Tunis	C	1											1					
Plague-infected rats		3	1					1	16		5							
Union of South Africa (see also table below)	C	5	[10] 2	4	3		[10] 1											

[1] Including plague in the United States and its possessions
[2] One case of suspected plague was reported in Algiers, Algeria, on July 7, 1937, and another suspected case on July 15.
[3] Suspected.
[4] Imported, pneumonic plague.
[5] Under date of June 1, estimated deaths from plague in Province of Fukien, China, reported to be 3,000 to 4,000.
[6] Information dated May 10, states that several hundred deaths from bubonic plague had been reported in Hsiatangchi, China.
[7] Imported.
[8] For the week ended July 10, 1937, 1 plague-infected rat was reported in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory.
[9] Pneumonic plague.
[10] For 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases, D, deaths; P, present]

Place	Nov. 29–Dec. 26, 1936	Dec. 27, 1936–Jan. 30, 1937	Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Week ended—												
					April 1937				May 1937					June 1937			
					3	10	17	24	1	8	15	22	29	5	12	19	26
United States:																	
California—Placer County—Plague-infected fleas [11]																	
Idaho—Bannock County—Plague-infected ground squirrels [12]																	([13])
Nevada [14] Douglas County C															1		
Oregon: [15]																	
Grant County—Plague-infected ground squirrel											1						
Lake County—Plague-infected fleas [15]																	
Wallowa County [15]—Plague-infected ground squirrels													1				1
Washington. Adams County—Plague-infected fleas and lice.[16]																	
On vessel. S. S. *Mooister* at Kingston from Maranhao, Para, and Manaos C				1													

Place		December 1936	January 1937	February 1937	March 1937	April 1937	May 1937
Argentina:							
Cordoba Province	C	5			1		
Salta Province	C		2				
San Luis Province	C	1					
Bolivia:							
Chuquisaca Department	C		P	5		[9] 2	
Oruro Department	C					[9] 1	
Potosi Department	C				[9] 3	[9] 1	
Brazil:							
Ceara State	C		1				
Parahyba State	C		4	1			
Pernambuco State	C			2			
Ecuador (see also table above):							
Manabi—							
Bahia	C			4	7	2	
Manta	C			8	12	13	

Place		December 1936	January 1937	February 1937	March 1937	April 1937	May 1937
Indochina (see also table above):							
Cambodia	C	1			1	4	4
Cochinchina	C	1	1				
Madagascar (central region)	C	176	[17] 170	[18] 219		57	
	D	167	161	199		57	
Peru	C	16	23	23	28	9	
Cajamarca Department	C				1		
Huancabamba Department	C					3	
Lambayeque Department	C	1	2	4		1	
Libertad Department	C	14	15	12	12	4	
Lima Department	C	1	4	5	1	1	
Lima City	C			1			
Piura Department	C		2	2	14		
Union of South Africa (see also table above)	C	2	2	3	3		

[9] Pneumonic plague.
[11] June 22, 1937, in fleas taken from chipmunks.
[12] July 8, 1937, in 1 lot of fleas and 1 tick taken from ground squirrels.
[13] Number unspecified
[14] Information dated July 16, 1937, states that plague has been proved by animal inoculation, in 1 lot of 10 fleas taken from 19 chipmunks in Ormsby County, Nev.
[15] May 7, 1937, in fleas taken from ground squirrels in Lake County; June 25, 1937, in fleas taken from ground squirrels in Wallowa County.
[16] Apr 29, 1937, in 2 lots of fleas and lice taken from ground squirrels.
[17] Includes 44 cases of pneumonic plague.
[18] Includes 66 cases of pneumonic plague.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases, D, deaths; P, present]

Place		Nov. 29–Dec. 26, 1936	Dec. 27, 1936–Jan 30, 1937	Jan 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Week ended— April 1937 3	10	17	24	May 1937 1	8	15	22	29	June 1937 5	12	19	26
Algeria:																		
Algiers Department	C		2								1					1	1	
Oran Department	C				2						3					1		
Southern Territories	C					2												
Angola (See table below)																		
Argentina. (See table below)																		
Belgian Congo. (See table below)																		
Bolivia. (See table below.)																		
Brazil																		
Bahia	C	20	14	7	6	3	4	2	6	3	4							
Porto Alegre (alastrim)	D	1	1					1	2	1								
Recife (alastrim)	C	15		1	3	1												
Rio de Janeiro	C		3															
British East Africa: Tanganyika	C	4	382	122	55		55		17	65		28				57		
Canada.																		
Alberta	C	[1] 4	2	[1] 46			[1] 1								[1] 1			
British Columbia	C		[1] 1															
Manitoba	C				[1] 1													
Saskatchewan	C			[1] 1														
Ceylon. Colombo	C			1														
China:																		
Amoy	C		3		3	1		1		1								
Canton	C	2		4	3		3	1			1		1					
Dairen	C	1	2	6	4			6	2			2						
Foochow	C	P	P	P	P	P		P		P		P			P		P	
Hangchow	C	1	5	3	1		1	2					1					
Hankow	C	5	7	5	8	2	3	5	1	1	5	2	1	2	2			
Hong Kong	C		7	5	7	6	18	5	3	7	4	1		4	4	3		
Macao	C				2													
Nanking	C	3	2	7	7	1	2							1				
Shanghai	C	93	231	127	96	14	11	11	19	8	11	10	12	13	3	6	6	3
Swatow	C				3	1	1		2		1		2	2				
Tienstsin	C	4	2	11	5		2	1		1	3	1	1	1	1			
Chosen. (See table below.)																		
Colombia: Barranquilla	D	7	1	3	2	1									1			
Dahomey. (See table below.)																		

Dutch East Indies: Java—**Surabaya**	C		[1] 1															
Ecuador: **Guayaquil**	C		10	33	73	7	11	7	9	4	6	9	12		20	8	14	6
Egypt:																		
Port Said	C								4									
Qena Province	C				1													
Eritrea (see also table below)	C			3	103			1	3					1		2		1
Estonia	C						2											
Finland. (See table below.)																		
France. (See table below.)																		
Gambia:																		
Bathurst	C				[2] 4													
MacCarthy Island	C				4													
Great Britain: England and Wales—																		
Derby	C				2													
Lancaster—Failsworth	C		2															
London and Great Towns (Oldham)	C	7																
Ripley	C				1													
Greece. Salonika	C	38	10	15	18	6	8	8	8	8	8	7	7	7	5			
Guatemala. (See table below.)																		
Honduras. **Puerto Castilla**	C							1										
India	C	4,605	10,849	13,761	12,592	3,539	3,450	2,410	2,623	2,216	2,427	2,009	2,143	2,111				
	D	1,136	2,740	3,219	3,005	726	826	494	511	442	585	468	580	614				
Assam	C	154	212	220	163	64	51	42	47	88	91	75	66	64	71	54	65	48
Bassein	C		18															
Bombay Presidency	C	170	671	905	782	200	244	251	452	318	286	153	262	159	194	98		
	D	30	99	140	136	39	44	45	70	60	30	35	64	39	39	20		
Bombay	C	7	25	49	63	38	21	33	44	40	34	21	40	30	24	18	23	40
	D	3	17	29	48	19	13	18	18	28	19	14	28	16	16	13	17	26
Calcutta	C	9	20	86	87	17	15	17	8	22	37	20	18	9	6	4	8	3
	D	7	12	34	68	14	16	10	11	16	2	14	11	4	5	4	8	2
Central Provinces and Berar	C	115	235	299	341	136	136	124	109	130	136	45	84	57	35	65	73	29
Chittagong	C	10	237	208	56	5	[2] 1	5	1	1					[2] 2			
Cochin	C						47			1				2				
Karachi	C	8	40	40	40	17	1	5	5	12	2	3		2	4		1	
Madras Presidency	C	161	671	579	632	161	109	140	159		131	107	115	130				
	D	37	131	84	118	26	16	25	22		24	21	30	23				
Madras	C	7	3	37	24	7	5		12	9	11	10	12	7	8	8	11	16
Moulmein	C	31	48	64	48	3	2	1	2							[2] 1		
Northwest Frontier Province	C	57	125	85	55	11	10	9	19	15	5	1		9	16	6	19	5
Orissa Province	C	376	681	1,049	848	166	204	131	265	126	150	172		170		199	122	136
Punjab	C	499	533	490	552	77	111	167	105	127	55	138	111	82	251	95	159	169
Rangoon	C	2	5	14	5	5	[2] 1	2	1	1		1		1				1
Sind State	C	180	195	184	143	36	96	38	93	5	58	31		96	40	52	57	105
Vizagapatam	C			3	1													
India (French): Chandernagor Territory	C				2													
India (Portuguese)	C	2																
Indochina (see also table below)																		
Pnom-Penh	C	1					1						1				1	
Saigon-Cholon	C		2	2														
Tourane	C		3	3	4	1	1	1										

[1] For 2 weeks.
[2] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Nov. 29-Dec 26, 1936	Dec 27, 1936-Jan. 30, 1937	Jan. 31-Feb 27, 1937	Feb. 28-Mar 27, 1937	Week ended— April 1937 3	10	17	24	May 1937 1	8	15	22	29	June 1937 5	12	19	26
Iran	C	1	11	10			2											
Teheran	C	1		2	2						1							
Iraq	C	30	1	1		6			8	1			1					
Baghdad	C									1								
Japan																		
Kobe	C				[2] 1													
Moji	C				1	2		6	2	1		1	1					
Osaka	C								1							[2] 1		
Yokohama	C			1				1										
Mexico (see also table below):																		
Chihuahua	C			3														
Durango	D	1	2	1	10	2		4	2	2	2			1		2		2
Guadalajara	D							1			1			1	1			
Mazatlan	C																1	
Mexico, D. F.	C	2	7	4	4	3	4	1	2	3	6	13	13	1				
Monterrey	C		2	11	1	3								1				
San Luis Potosi	D											1						
Torreon	C	3	31	7	1	2	2	5	2		3	6	12	1	2	4		6
Morocco. (See table below.)																		
Nicaragua: **Puerto Cabezas**	C			2														
Nigeria	C	[1] 11	300	19	406				188		281							
Lagos	C			1				1										
Nyasaland. (See table below.)																		
Palestine. (See table below)																		
Poland	C			1														
Portugal (see also table below):																		
Lisbon	C		2	1	2			1				1			3	1		2
Oporto	C		1	1														
Salvador. (See table below.)																		
Siam: Tak Province	C			26	1		4	1	2							2	1	
Sierra Leone	C	38	88	12							2				1			
Freetown	C	3		1														
Southern Rhodesia	C	10					1											
Sudan (Anglo-Egyptian)	C	116	37	75	12			1	1	7	3		1	2		33	1	5
Tunisia	C		1	105														4
Uruguay	C			1												2		

[1] For 2 weeks. [2] Imported.

On vessels:

S. S. *Jaldurga* at Rangoon from Gopalpur	1 case	Dec. 30, 1936
S. S. *Egra* at Rangoon from Calcutta	1 case	Jan. 4, 1937
S. S. *Tango Maru* at Singapore from Japan	1 death	Jan. 16, 1937
S. S. *Juna* at Rangoon from Penang	1 case	Jan. 27, 1937
S. S. *Horai Maru* at Moji from Keelung	2 cases	Jan. 28, 1937
S. S. *Tjibadak* at Surabaya from Shanghai	1 case	Jan. 28, 1937
S. S. *Colorado Springs* at Manila from Shanghai	1 case	Feb. 1, 1937
S. S. *Nikko Maru* at Moji from Tsingtao	1 case	Feb. 7, 1937
S. S. *Bhadravati* at Bombay from Vengurla	1 case	Feb 18, 1937
S. S. *Nagasaki Maru* at Nagasaki from Shanghai	1 case	Mar. 8, 1937

On vessels—Continued.

S. S. *Kiangsu* at Swatow from Bangkok	1 case	Mar. 13, 1937
S. S. *Sumatra* at Calcutta	2 cases	Mar. 21, 1937
S. S. *Englestan* at Rangoon from Chittagong	1 case	Mar. 25, 1937
S. S. *Danken* at Hong Kong	1 case	Mar. 31, 1937
S. S. *Talma* at Hong Kong	1 case	Apr. 1, 1937
S. S. *Jalagopal* at Rangoon from Chittagong	1 case	Apr. 2, 1937
S. S. *Taksang* at Hong Kong	1 case	Apr. 13, 1937
S. S. *President Hoover* at Yokohama from Honolulu	1 case	Apr. 17, 1937
S. S. *Hydri* at Karachi	1 case	Apr. 24, 1937
S. S. *G. G. Pasquier* at Singapore from Saigon	1 case	May 7, 1937

Place		December 1936	January 1937	February 1937	March 1937	April 1937	May 1937
Angola	C	24					
Argentina:							
Corrientes Province	C	1					
Salta Province	C	2					
Belgian Congo	C	98	111	158	253	143	
Bolivia	C		28	4	5	25	48
China: Manchuria—Harbin	C				3	11	
Chosen	C	2	1	41	58	73	
Dahomey	C	11			5		
Eritrea (see also table above)	C	1					
Finland	C	1	1	1			
France	C				1	1	1
Guatemala	C	4	5	2			
Indochina (see also table above)	C	219	306	382	505	316	274
	D	38	84	70	97	46	95
Mexico (see also table above):							
Aguascalientes State—Aguascalientes	C		1	1		1	
Chihuahua State	C					1	
Colima State	C			2		4	
Mexico (see also table above)—Continued							
Jalisco State—Guadalajara	C		1	1		1	
Mexico State	C				1		
Mexico, D. F.	C		12		16	13	
Mexico City	D	2	5	2			
Morelos State	C		4				
Nayarit State	C		1				
Nuevo Leon State—Monterrey	C			6			
Puebla State—Puebla	C		1				
Queretaro State	C				3	1	
San Luis Potosi State—San Luis Potosi	C		1	1		1	
Morocco	C	2	6	6		6	1
Nyasaland	C			7		3	
Palestine	C		2	8			
Portugal (see also table above)	C	162	113	59	27	15	
	D	8	3	6	2	5	
Salvador	C					4	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases, D, deaths, P, present]

Place		Nov 29–Dec 26, 1936	Dec 27, 1936–Jan 30, 1937	Jan 31–Feb 27, 1937	Week ended— March 1937: 6	13	20	27	April 1937: 3	10	17	24	May 1937: 1	8	15	22	29	June 1937: 5	12	19
Algeria.																				
Algiers Department	C	19	71	128	5	41	14	24	16	19	35	26	17	14	30	9	8	2	27	47
Algiers	C	1	1	2	1	1	—	1	2	—	2	—	1	—	1	2	—	—	1	1
Constantine Department	C	98	159	139	36	50	66	73	64	128	70	86	98	47	92	71	109	115	—	68
Bone	C	—	2	10	—	—	3	—	—	—	2	2	1	—	—	4	1	11	—	—
Constantine	C	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Philippeville	C	1	6	—	—	—	1	—	—	—	—	—	1	—	—	—	—	—	—	—
Oran Department	C	—	10	64	67	—	5	—	—	2	2	20	1	3	—	—	6	8	9	9
Southern Territories	C	—	5	9	2	—	—	—	—	—	1	—	—	—	—	—	2	1	5	3
Arabia: **Aden**	C	—	—	—	[1] 1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Australia: Sydney	C	—	—	—	—	—	—	1	—	—	—	—	—	—	—	1	—	—	—	—
Bolivia. (See table below.)																				
Bulgaria. (See table below.)																				
Chile	C	385	401	226	53	52	37	33	39	53	42	20	41	—	—	—	—	—	—	—
Concepcion Province	C	—	—	18	3	3	8	6	6	2	5	1	—	—	—	—	—	—	—	—
Iquique	C	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	2	—
Santiago Province	C	242	—	130	25	28	10	6	14	19	16	9	27	—	—	—	—	—	—	—
Valparaiso	C	21	10	10	11	11	10	5	9	14	9	7	2	17	13	28	11	30	22	29
China (see also table below):																				
Dairen	C	4	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Hankow	C	—	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Nanking	C	—	—	—	—	—	—	—	—	—	—	—	—	3	1	—	—	—	—	—
Shanghai	C	—	—	—	1	—	—	—	—	—	—	—	—	1	2	—	1	1	—	—
Swatow	C	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tientsin	C	—	1	1	1	—	—	—	—	—	1	—	—	1	1	—	—	1	—	—
Tsingtao	C	3	—	2	—	—	—	—	—	—	—	1	7	4	1	—	—	—	—	—
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C	1	10	9	1	2	1	1	1	—	1	3	4	4	5	3	4	4	1	—
Aswan Province	C	—	—	—	1	6	—	—	—	—	3	2	4	—	—	—	2	—	—	—
Asyut Province	C	—	—	2	—	5	—	—	—	—	—	—	—	—	—	—	—	5	—	—
Beheira Province	C	—	8	60	2	16	—	—	—	—	20	33	24	—	27	—	23	14	—	—
Beni-Suef Province	C	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
Cairo	C	—	—	4	2	5	3	1	3	1	6	4	4	4	6	2	1	1	—	—
Dakahilya Province	C	—	—	25	7	8	—	—	—	—	12	26	24	—	35	—	15	15	—	—
Damietta Province	C	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	1	—

Faiyum Province	C	1	1																	
Gharbiya Province	C	3	5	20	8	4					19	40	40		56		39	55		
Girga Province	C	2															1	2		
Minufiya Province	C		1	20		6					1	10	6		10		9	4		
Minya Province	C		1	21											1		1			
Port Said	C	2	8	1																1
Qena Province	C		1								4	10	26		6		1	3		
Sharkiya Province	C		1		1							2	10				1	3		
Suez	C																			1
Provinces	C	14	114	175	19	50	35	19	24	36	60	123	144	170	150	149	96	106	59	85
Eritrea. Asmara	C		14	1						2	2	2	3			1		1	1	
France. (See table below.)																				
Greece (see also table below). **Salonika**	C	4	1																	
Guatemala. (See table below.)																				
Hawaii Territory: **Honolulu**	C	2	5				1		1											
Hungary	C			7			1	11								1				
Iran	C	4	7	19		1	9	1		6	1			4		7	3	15		
Teheran	C	1	2	3										1				1		
Iraq:																				
Baghdad	C		1						15											
Diwaniyeh Province	C													6						
Kirkuk Province	C							12				8		2			1	2	4	6
Kut Province	C									1										
Irish Free State: Kerry County—Caherciveen	C			4					4											
Latvia. (See table below.)																				
Libya. (See table below.)																				
Lithuania. (See table below.)																				
Mexico (see also table below):																				
Mexico, D. F.	C	4	12	20	1	1	5	4	4	4	2	3	4	7	2	3	2			
San Luis Potosi	D	1	2																1	
Torreon	C									1										
Morocco (see also table below)	C	1	5	22	5	7	7	5	30	23	23	39	69	65	70	47	101	49	50	38
Casablanca	C																	200		
Palestine.																				
Haifa	C	11	3	1	1					1			1	1		2	2		1	
Jaffa	C	8	2		1	1			2	1		1	1		2	1	2		2	1
Peru. (See table below.)																				
Poland	C	175	399	485	101	140	100	121	161	169	136	163	158	132	205	199	111	106	76	
	D	13	22	26	7	7	13	6	9	12	7	12	9	11	10	5	8	5	9	
Rumania. (See table below.)																				
Sierra Leone. Freetown	C		1	1										2						
Straits Settlements. **Singapore**	C		1																	
Sudan (Anglo Egyptian)	C	8																		
Syria	C									1										
Trans-Jordan	C			3	1					1	2		3				2			
Tunisia:																				
Tunis	C		7	5	2		1	1		1	3		2	3	9	1	5	3	9	2
Provinces	C	54	214	247	138	119	168	125	79	102	133	114	90	166	133	136	141	93	183	139
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia. (See table below.)																				
On vessel. At Santos	C						P													

[1] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		December 1936	January 1937	February 1937	March 1937	April 1937	May 1937
Bolivia	C	-------	24	25	30	48	39
Bulgaria	C	19	19	-------	-------	-------	-------
China: Manchuria—Harbin	C	7	8	35	58	45	-------
Chosen	C	28	88	149	154	147	-------
Czechoslovakia	C	3	15	12	33	25	-------
France	C	1	-------	-------	-------	-------	-------
Greece (see also table above)	C	2	7	2	4	2	-------
Guatemala	C	28	29	19	4	13	12
Latvia	C	-------	-------	-------	1	1	-------
Libya	C	-------	-------	-------	-------	-------	13
Lithuania	C	3	13	10	23	37	6
Mexico (see also table above):							
Aguascalientes State: Aguascalientes	C	-------	2	3	1	1	-------
Guanajuato State	C	-------	-------	-------	2	-------	-------
Hidalgo State	C	-------	-------	-------	-------	5	-------
Jalisco State—Guadalajara	D	-------	-------	-------	1	-------	-------
Mexico State	C	-------	8	-------	1	-------	-------
	D	-------	1	-------	1	-------	-------

Place		December 1936	January 1937	February 1937	March 1937	April 1937	May 1937
Mexico—Continued.							
Mexico, D F	C	-------	14	18	12	16	-------
Mexico City	D	5	6	6	-------	-------	-------
Oaxaca State	C	-------	-------	2	-------	-------	-------
Puebla State Puebla	C	9	7	3	-------	-------	-------
Queretaro State	C	-------	1	2	1	1	-------
San Luis Potosí State: San Luis Potosí	C	7	7	-------	2	2	-------
Morocco (see also table above)	C	2	11	22	27	190	283
Peru	C	52	-------	-------	-------	-------	-------
Rumania	C	380	941	1,018	917	832	-------
Turkey	C	21	24	50	68	39	-------
Istanbul	C	1	7	3	-------	3	-------
Union of South Africa:							
Cape Province	C	61	52	12	38	41	-------
Natal	C	4	4	1	1	-------	-------
Orange Free State	C	8	5	11	5	3	-------
Transvaal	C	6	13	1	2	-------	-------
Yugoslavia	C	49	159	125	-------	-------	-------

YELLOW FEVER

Place		Nov. 29–Dec. 26, 1936	Dec. 27, 1936–Jan. 30, 1937	Jan. 31–Feb. 27, 1937	Week ended— March 1937 6	13	20	27	April 1937 3	10	17	24	May 1937 1	8	15	22	29	June 1937 5	12	19	26
Brazil: [1]																					
Acre Territory	D		1	1																	
Matto Grosso State [1]	C	1		20	1																
	D		3	6			1	2					2	1							
Minas Geraes State [1]	C		1	2																	
	D		1	13	9	5	12	8	3	6	2	2	1								
Para State [1]	D											1									
Paraná State	C			2																	
São Paulo State [1]	C		4	1																	
	D		4	14	9	4	8	[2] 17	4	5	6	1									
Colombia	C	3																			
	D	1																			
Barrancabermeja	C			1																	
Dahomey: Boucon	C																				[3] 1
French Equatorial Africa:																					
Brazzaville	D											1									
Libreville	C						1														
	D			1																	
Gold Coast [4]																					
Aburi	C													1							
Accra [4]	C		5	3																1	1
Adeiso.[4]																					
Apesi	C																1		2		
	D																1		1		
Eastern Province.[4]																					
Huhunya.[4]																					
Nepom [4]	C																		[3] 3	[3] 2	1
Nugo	C																1				
Prastea	C																		1		
Swedru [4]																					
Tamale	C	1																			
Teshi	C		1				1							1							

[1] See also reports of yellow fever in Brazil on pp. 463, 536, 657, 683, 762, 818, and 912, of the PUBLIC HEALTH REPORTS.
[2] For 3 weeks.
[3] Suspected.
[4] Yellow fever has also been reported in Gold Coast as follows: During the week ended July 3, 1937, 1 case at Accra; 1 case at Adeiso; 1 case at Huhunya; 2 cases at Mepom; and 1 case at Swedru. During the week ended July 17, 1937, 4 cases and 4 deaths were reported in Eastern Province, Gold Coast.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER—Continued

[C indicates cases, D, deaths; P, present]

Place		Nov. 29–Dec. 26, 1936	Dec. 27, 1936–Jan. 30, 1937	Jan. 31–Feb. 27, 1937	Week ended— March 1937				April 1937				May 1937					June 1937			
					6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26
Ivory Coast:																					
Adzope	C			3																	
Agboville	C						1														
Nigeria:																					
Ogbomosho.[5]																					
Uyo	C	1																			
Paraguay.[6]																					
Peru: Perene region (Pampa Whaley)	C								[7] 10	[7] 13											
	D								5	3											
Senegal:																					
Bambey	C																				[3] 1
Dakar	C														[3] 1						
Diakhao	C						1						1								
Fatick.[8]																					
Linguere	C																			[3] 1	
Malem Hodar	C																1				
Thies Circle—Khombole	C									1											
Tilmaka	C									1						1					
Tivaouane	C									1											
Sudan (French): Mahina	C													[3] 1							

[3] Suspected.
[5] Yellow fever has been reported in Ogbomosho, Nigeria, as follows: During the week ended July 3, 1937, 3 cases with 1 death, and for the week ended July 10, 1 case.
[6] A dispatch dated June 4, 1937, from the United States legation in Asuncion, Paraguay, states that yellow fever has been officially reported in the northwestern part of Paraguay.
[7] Jungle type.
[8] The case of yellow fever reported in Fatick, Senegal, on p. 722 of PUBLIC HEALTH REPORTS of May 28, 1937, has not been confirmed.

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UNITED STATES TREASURY DEPARTMENT

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THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen. ROBERT OLESEN, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 52 AUGUST 6, 1937 NO. 32

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

June 20–July 17, 1937

The accompanying tables summarize the prevalence of eight important communicable diseases based on weekly telegraphic reports from State Health Departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of Disease." Table 1 gives the number of cases of poliomyelitis reported in recent weeks of 1937 and in corresponding weeks of 1936 and 1935, by geographic regions, and table 2 gives the number of cases of eight important communicable diseases, including poliomyelitis, for the 4-week period ending July 17, the number reported for the corresponding period in 1936, and the median number for the years 1932–36.

DISEASES ABOVE MEDIAN PREVALENCE

The number of reported cases of influenza, meningococcus meningitis, poliomyelitis, and scarlet fever exceeded the median number reported for the corresponding period during the past 5 years.

Poliomyelitis.—The poliomyelitis situation in the South Central region, to which attention has been called in previous summaries, has grown more serious, and the incidence has also risen in other sections of the country. An increase of this disease is to be expected at this time of the year, but the current incidence is considerably higher than the seasonal median for the 5 preceding years.

Slightly more than two-thirds of the total of 771 cases occurring during the 4 weeks ending July 17 were reported from the two South Central regions, but every region except the New England and Middle Atlantic reported an excess over the median incidence.

An examination of the regional distribution in table 1 for 1937, 1936, and 1935 shows that the disease is more prevalent than last year in all regions except New England, where the incidence is about normal. From May 9 to the latest date for which reports had been received at the time this compilation was made (week ending July 24), there had been 486 cases reported from the West South Central region, as compared with 18 and 65 for the corresponding period in the

TABLE 1.—*Poliomyelitis cases reported in recent weeks of 1937, and in corresponding weeks of 1936 and 1935, by geographic regions*

Region and year	Week ending—										
	May 15	May 22	May 29	June 5	June 12	June 19	June 26	July 3	July 10	July 17	July 24
All States: [a]											
1937	22	18	21	36	38	69	82	158	256	275	324
1936	22	21	22	21	26	20	28	32	61	135	119
1935	29	19	38	50	51	101	146	160	156	191	220
New England:											
1937	0	1	0	1	1	3	1	3	7	4	15
1936	2	1	6	8	4	2	1	0	0	5	10
1935	0	0	2	1	3	1	4	5	3	4	18
Middle Atlantic:											
1937	1	3	1	4	1	4	3	5	7	12	9
1936	4	4	3	2	5	3	1	4	5	5	5
1935	1	1	3	3	5	2	13	14	11	24	23
East North Central:											
1937	4	4	4	3	1	5	5	5	14	32	44
1936	2	4	5	0	8	1	5	5	3	10	5
1935	3	1	1	2	3	5	5	5	6	8	4
West North Central:											
1937	1	0	0	3	2	2	3	4	25	14	23
1936	1	0	0	1	1	2	1	1	1	3	1
1935	2	1	0	2	3	2	0	0	4	1	4
South Atlantic:											
1937	1	1	3	2	5	6	12	14	14	18	16
1936	3	3	1	3	1	5	1	4	6	7	6
1935	4	4	21	31	21	60	78	90	87	103	124
East South Central:											
1937	6	3	7	11	10	30	32	53	42	33	90
1936	0	1	3	1	0	1	9	7	38	95	79
1935	3	1	1	3	1	3	2	7	7	18	11
West South Central:											
1937	5	3	1	5	11	11	17	63	135	141	91
1936	3	1	0	0	1	4	2	3	1	1	2
1935	7	6	3	4	6	7	9	4	6	4	9
Mountain: [a]											
1937	0	0	0	0	0	0	0	3	4	2	9
1936	3	2	0	1	3	0	1	0	0	0	1
1935	0	0	1	1	0	1	3	1	0	0	0
Pacific:											
1937	4	3	5	7	4	8	9	8	8	19	22
1936	4	5	4	5	3	2	7	8	7	9	16
1935	9	5	6	3	9	20	32	34	32	29	38

[a] Exclusive of Nevada, for which no reports are received.

years 1936 and 1935, respectively. For this same period the cases in the East South Central region totaled 317, as against 234 in 1936 and 57 in 1935. The highest incidence in this region in the current period was reported from Tennessee and Mississippi. The largest numbers of cases reported from other regions were from widely scattered States—California reported 85 cases; Ohio, 51; Missouri, 47; and North Carolina, 40.

In 1936 an outbreak of poliomyelitis started at about this time in Alabama and later spread into adjoining States in the East South Central region. In 1935 poliomyelitis was unusually prevalent at this time in North Carolina and Virginia, and later spread into States in the North Atlantic regions. In 1934 an epidemic occurred in California and other western States, and the total cases for this period numbered approximately 2,500. With the exception of 1934, the total of 1,299 cases in 1937 during the 11-week period included in the table is the highest incidence for this period in any of the 9 years for which data are available.

Table 2.—*Number of reported cases of eight communicable diseases in the United States during the 4-week period June 20–July 17, 1937, the number for the corresponding period in 1936, and the median number of cases reported for the corresponding period, 1932–36* [1]

Region	Current period	1936	5-year median	Current period	1936	5-year median	Current period	1936	5-year median	Current period	1936	5-year median
	Diphtheria			Influenza [2]			Measles [3]			Meningococcus meningitis		
U. S.[1]	1,249	1,232	1,592	1,269	2,691	1,068	22,810	24,029	27,149	296	362	145
N. Eng.	59	32	82	5	3	5	1,661	4,182	3,315	14	8	12
Mid. Atl.	241	294	346	19	36	20	8,422	10,052	8,899	81	72	34
E. N. C.	317	299	320	124	177	194	7,655	1,806	10,438	33	62	79
W. N. C.	83	108	165	322	118	77	341	504	1,166	19	16	13
S. Atl.	160	180	195	220	227	263	1,688	1,694	1,813	53	106	16
E. S. C.	82	84	110	60	109	110	967	149	436	43	46	13
W. S. C.	155	109	257	399	380	237	859	463	463	29	18	11
Mount.	41	32	45	52	74	23	559	504	504	3	9	9
Pac.	111	94	138	68	1,567	140	658	4,675	2,070	21	25	13
	Poliomyelitis			Scarlet fever			Smallpox			Typhoid fever		
U. S.[1]	771	256	256	8,017	9,638	7,531	479	534	482	1,770	1,240	2,132
N. Eng.	15	6	15	652	649	764	0	0	0	14	24	24
Mid. Atl.	27	15	39	2,381	2,878	2,686	0	2	0	132	115	151
E. N. C.	56	23	24	2,932	3,037	3,037	98	116	79	139	100	234
W. N. C.	46	6	11	751	1,244	439	188	220	97	114	78	108
S. Atl.	58	18	18	288	330	330	1	9	9	479	257	571
E. S. C.	160	149	19	105	135	139	5	4	4	345	267	428
W. S. C.	356	7	16	241	122	158	16	7	56	446	240	497
Mount.	9	1	2	217	382	164	101	149	39	48	56	62
Pac.	44	31	31	450	881	584	70	27	107	53	103	60

[1] 48 States. Nevada is excluded and the District of Columbia is counted as a State in these reports.
[2] 44 States and New York City. The median is for the years 1933–36 only, the data for 1932 are not comparable.
[3] 46 States. Mississippi and Georgia are not included.

Scarlet fever.—The scarlet fever incidence was low in relation to the high years of 1936 and 1935, but it was slightly above the median for the years 1932–36. The number of cases reported from the West North Central, West South Central, and Mountain States was somewhat above the seasonal expectancy; in other regions the incidence was relatively low.

Influenza.—The number of cases of influenza was slightly above the average for the four preceding years. The incidence in the West North Central, and West South Central areas, particularly in North Dakota and Texas, was a little above normal for this season of the year; in all other regions the situation was very favorable.

Meningococcus meningitis.—The incidence of meningococcus meningitis dropped considerably below that for the corresponding periods in 1936 and 1935, when the cases totaled 362 and 392, respectively. The number of cases reported for the current period was, however, more than twice the median number of cases for the years 1932–36. Although the incidence in the South Atlantic and South Central regions declined appreciably from that during the preceding 4-week period, the numbers of cases reported from those areas were still

relatively high. New York and Pennsylvania, in the Middle Atlantic region, reported 39 and 36 cases, respectively, for the current period, each figure being a little higher than normal for those States.

DISEASES BELOW MEDIAN PREVALENCE

The numbers of cases of diphtheria, measles, and typhoid fever were considerably below the median for the 5 preceding years, while the incidence of smallpox stood approximately at the median level. The incidence of measles was somewhat above the seasonal expectancy in the South Central regions, and the North Central and Mountain regions continued to report a relatively high incidence of smallpox.

Compared with the corresponding period in 1936, the current incidence of typhoid fever was about 45 percent in excess of last year's figure, and for the first time in recent years the downward trend of diphtheria in the country as a whole was interrupted; the number of cases (1,249) reported for the current period was slightly above that (1,232) for the corresponding period of 1936.

MORTALITY, ALL CAUSES

The average mortality rate for large cities during the 4-week period ended July 17, based on data received from the Bureau of the Census, was 11.0 per 1,000 inhabitants (annual basis). The rates for the separate weeks were 10.6, 10.4, 10.6, and 12.4. The average rate for this 4-week period in the 3 preceding years was 11.4, 11.3, and 11.1, regressively.

The sharp increase in the death rate in the last week of the current period was without doubt due to high temperatures in the New England and Middle Atlantic States. In some cities in those States the number of deaths was approximately twice the number reported during this period in 1936, while for others a 50-percent increase over last year was reported.

STUDIES ON CHRONIC BRUCELLOSIS

I. Introduction

By ALICE C. EVANS, *Senior Bacteriologist, National Institute of Health, United States Public Health Service*

Surveys have recently been conducted in three widely separated sections of the United States to obtain such information as might be available concerning the prevalence of chronic brucellosis (chronic undulant fever). It is expected to report the results of these surveys in future papers of this series. The present paper gives a brief review

of the literature and presents evidence of the difficulties in diagnosis of the chronic form of brucellosis.

In his monograph on "Undulant Fever", Hughes (1897) mentioned cases in which sciatica continued for over a year and a half. He stated that prolonged cases do not return to their original state of health for 12 to 24 months; in many cases years are required for complete recovery.

A report of cases of chronic brucellosis appeared in the American literature subsequent to the return of the United States Army from the Philippines. Craig (1903, 1906) described three chronic cases, all of which had been treated unsuccessfully for malaria in the Philippines. He reported important observations on the chronic form of the disease. He stated that, in many cases, after the initial attack, a chronic infection results and is characterized by symptoms so slight as to be unrecognizable unless watched for and understood. He noted the low, uncharacteristic temperature curve, and remarked that, instead of being an aid to diagnosis, it is the reverse, and is the chief cause of mistaken diagnoses. He noted the absence of physical signs of disease.

In spite of the recognition of the chronic form of brucellosis in those early classics, the disease has not received the attention which it merits and is seldom considered in cases of chronic disease of obscure origin in the United States. Within recent years, however, it has been discussed by a number of writers.

In 1928 Baker reported a case of intermittent hydrarthrosis and moderate general debility in which the symptoms had continued for 8 months before the patient was hospitalized. *Brucella* were cultured from the blood and from the material obtained by puncture of each knee joint. Agglutination reactions with the homologous and other strains remained negative throughout the first 2 months of hospitalization.

In 1931 Amoss reported two cases of chronic brucellosis. In one case *Brucella* were found localized in the fallopian tube, in the glands of the meso-appendix, in the appendix, and in benign cysts of the ovaries. In the other case, in which symptoms persisted for many years, *Brucella* were cultivated from hemorrhagic ovarian cysts removed at operation, and 3 years later *Brucella* were cultivated from bile obtained by duodenal drainage and from the wall of the gall-bladder removed at operation. In this case there were no abnormalities found on physical examination or by X-ray examinations. The agglutination reaction remained negative throughout the course of the chronic disease.

In 1934 Cameron and Wells reported that, during the 3 preceding years, 46 cases of brucellosis were diagnosed in Washington County,

Md. Ten of the series continued to suffer ill effects of the disease for long periods. Six were confined to bed at more or less irregular intervals for more than 2 years.

In the 1935 literature on brucellosis there are several articles dealing with the chronic form of the disease. Thames stated that *Brucella* infection may commonly result in various disorders of long duration. He reported three cases, in two of which a marked specific intradermal reaction indicated brucellosis. In one of these cases, an agglutination titer of 1:80 offered additional evidence of *Brucella* infection. Marietta reported in detail a prolonged case of brucellosis, with spinal meningitis occurring during one stage of the disease, followed by bone involvement. Angle reported that, among the 100 cases of brucellosis which he had seen, two general types could be recognized—acute and chronic. In the latter, the symptoms persisted for long periods, with neurologic symptoms particularly manifest. Harris reported that he had seen 75 cases within the 2½ preceding years. All but 19 of these cases were chronic. Schoville reported a mild ambulatory case with normal or nearly normal temperature and negative agglutination titers, but markedly positive skin and phagocytic reactions. At various times the diagnoses were neurasthenia, undiscoverable focus of infection, and chronic neutropenic state.

In 1936 Hamman and Wainwright reported the results of their re-examination of 36 patients with long-continued low grade fever. An accurate diagnosis was finally made on 10 of them, among whom were 3 cases of brucellosis. Questionable diagnoses were made on 6 more patients among whom was 1 case of questionable brucellosis. Hamman and Wainwright give a detailed report of one of their cases of chronic brucellosis. The experience of their patient was typical of that of many who have consulted with the writer—prolonged ill health, examinations revealing no organic abnormality, a diagnosis of neurasthenia, and finally a diagnosis of *Brucella* infection.

DeJong reported a case of brucellosis in which prolonged meningo-encephalitis developed after the disease had run an uneventful course for many months. *Brucella* were cultivated from the spinal fluid.

Recently McCullagh and Clodfelter reported four cases of encephalitis due to *Brucella* infection. Three of the cases were prolonged. One of them gave an agglutinin titer of 1:160. In the other two cases, the agglutination reaction was negative but intradermal reactions were strong.

From the above review of the literature, the conclusion may be drawn that chronic brucellosis is extremely difficult to diagnose correctly. Physical signs of disease, a significant temperature curve, and positive agglutination reaction may all be lacking throughout years of illness.

In a previous publication, the writer's reasons for thinking that cases of unrecognized chronic brucellosis may be common in this country were discussed. The facts may be summarized as follows:

1. *Brucella* infection is known to occur in domestic and experimental animals which appear to be healthy.
2. Milch animals are known to be commonly infected with *Brucella*, which are excreted in the milk.
3. Milk is consumed raw on farms, in villages, in small towns, and in some cities.
4. Acute *Brucella* infections in man can be diagnosed only by means of laboratory tests.
5. Laboratory tests to detect *Brucella* infection are made as a rule only in cases of definite fever, rarely in cases of mild chronic disease.
6. The severity of *Brucella* infection in man is known to vary from the acute disease to a form so mild that the subject is unaware of illness.
7. Chronic ill health of undetermined cause is widely prevalent.

Through the writer's own experience with chronic brucellosis which failed to receive the correct diagnosis for many years following an acute attack, and through the similar experiences of many sufferers with the chronic form of the disease with whom contact was made through correspondence or consultation, the conviction grew that *Brucella* infection might be responsible for much ill health in spite of the fact that it is rarely recognized in cases of chronic disease. The file of letters from chronic brucellosis patients revealed that almost invariably before the correct diagnosis of chronic brucellosis was made, the patient had suffered for a long time with mild disease of obscure origin. In about 25 percent of the cases the patients were physicians or members of the family of a physician—that is, they were individuals for whom an unsatisfactory diagnosis would be less likely to be allowed to stand than in the case of the average person. In several cases the lay patient was the first to suggest undulant fever to the doctor, either because the symptoms were recognized as the same in mild form as were suffered at an earlier time during an acute attack, or the idea was obtained through the reading of popular articles about brucellosis.

In one case the patient spent a consecutive period of more than 1 year in three different hospitals, finally receiving the combined attention of the staff of a well-known teaching hospital, and yet diagnosis failed until another malady was discovered necessitating an operation which revealed also the focus from which *Brucella* were cultivated. A similar incident was reported to the writer (personal communication) to have occurred in a teaching hospital in London.

The following résumé of the correspondence in regard to one case is illustrative of many cases:

A woman wrote that her husband, who was in the habit of drinking about 3 quarts of raw milk daily, had been in ill health for about 15 months, but had con-

tinued with his work. He had consulted several physicians, none of whom was able to find any cause for complaint. The patient in some way arrived at a vague conviction that he was being poisoned by the milk he was drinking. His wife, who was a nurse, went to the public library and read everything she could find on diseases caused by drinking raw milk, including an article on brucellosis. Thus she conceived the idea that her husband's trouble might be brucellosis. She wrote asking for suggestions. This patient, who lived near Seattle, Wash., was advised to consult Senior Surgeon G. C. Lake, of the United States Marine Hospital, Seattle, who has had a wide experience with brucellosis in its various forms. On the basis of history, symptoms, and positive agglutination reaction, Dr. Lake made a diagnosis of brucellosis.

In another case, ill health continued for almost 20 years. In 1919 a diagnosis of tuberculosis was made. Six months later, and repeatedly since that time, a diagnosis of chronic nervous exhaustion was made. In 1936 the patient developed a severe attack of typical acute brucellosis, not recognized at the time. Since the acute attack the patient has been confined to bed almost continuously. Finally, in 1937, a culture was obtained from the urine and sent to the National Institute of Health for identification. It proved to be *Brucella melitensis* variety *abortus*. During these 20 years of ill health, brucellosis seems to have been considered only once before, when an agglutination test was made, which was interpreted as negative.

Although there is no test which will give a definite diagnosis, the evidence appeared to demand an investigation to determine to what extent *Brucella* infection may be responsible for the many cases of chronic ill health for which satisfactory diagnoses cannot be made. It seemed worth while to investigate the incidence of the disease in several sections of the country, using such tests as were available. Investigations were therefore conducted by the United States Public Health Service in San Antonio, Tex., Charlotte, N. C., and Kansas City, Kans. These cities were chosen because they represent sections of the United States in which the sources of infection differ according to the different proportions of cattle, hogs, and goats in their respective localities. The percentages of raw milk sold in these cities is as follows: Charlotte, 81 percent; Kansas City, 45 percent; San Antonio, 36 percent.

The investigators began their studies by presenting to the local physicians the plan and purpose of their investigation, requesting an opportunity to cooperate in cases of disease in which the diagnosis was uncertain. In all three cities this cooperation was generously given. In each case in which the cooperation of the investigator was requested, examinations were made for agglutination, opsono-cytophagic and intradermal reactions, as well as for suggestive history and symptoms.

Cultural studies on some of the suggestive cases are now in progress. The data from these studies will be analyzed for the information they

may yield on the prevalence of chronic brucellosis and for the indications they may give on the significance of the specific tests.

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CASE RECORDS AS AN INDEX OF THE PUBLIC HEALTH NURSE'S WORK[1]

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The work of a nurse on the staff of a county health department may be divided into two broad categories—that which she performs in the capacity of an assistant and that which she does largely on her own initiative. The first division of her activities includes attendance at clinics for tuberculosis and venereal disease, at maternity and child health conferences, and participation in school medical inspection. When carrying out these functions the separate identity of the nurse disappears, because her work and techniques are fused with those of the physician. Clinic visits, physical examinations, or similar services are reported with the patient as the central figure. Nurse participa-

[1] From the Division of Public Health Methods, National Institute of Health, in cooperation with the Division of Domestic Quarantine

tion in such joint enterprises can be expressed chiefly by the amount of time consumed during a report period.

In the performance of activities for which she is primarily responsible, the county health department nurse may render to groups educational services which cannot be readily assigned to the individual beneficiary. Neither can these efforts be rightfully multiplied by the number in attendance. Group and community work on the part of the nurse should therefore be expressed on a basis of time involved, related perhaps to the total number of individuals served.

Insofar as records portray the activities of a nurse, she can be identified most easily when, as a lone worker, she interviews individual patients on matters pertaining to personal health. Such service forms the basis for most accounts of public health nursing. Quite important, therefore, is consideration of the recording policies in different health departments and the extent to which such policies are carried out in actual practice.

During the course of any representative day, a nurse will make professional contact with several individuals. Almost without exception she enters in consecutive order on a form, commonly spoken of as the "daily report", the name and address of each contact together with some classification of the service. Beyond this initial step in record keeping, the practice may vary between health departments, depending in large part on local policy and to some extent on the faithfulness with which the nurses observe instructions.

When a nurse is confronted with a condition that suggests the necessity for a permanent office record or the desirability of further attention, it is common practice to open an individual or case record. After the case record has been opened, an account of each contact with the individual is made on this as well as on the current daily report.

From a local standpoint the system of record keeping just described might be regarded as common sense practice and, if thoroughly understood, should give rise to no complications unless analyses are undertaken which require more data than may be found on the daily report. Occasions for analysis, however, are becoming more frequent. The alert administrator certainly can use more than a gross summary of visits. Even the simple tabulations required for making reports to governmental agencies that contribute to local budgets and for completing various devices used in the appraisal of local health service necessitate some description of the individual and the service. As a

result, instructions [2] commonly specify that credit can be given only for service that is entered in a formal way on case records. It is quite apparent that a measure of the volume of service obtained by summating all activities which were entered on the daily reports of nurses may differ considerably from the amount that would be revealed by a count of only those services that were also recorded on individual case cards.

Certain studies which the United States Public Health Service is making of county health department practice afforded an opportunity for determining the nature and extent of these differences. In each of three counties considered, health service is under the direction of a full-time medical health officer. One county, which will be referred to as county A, employed only a single staff nurse; the others, county B and county C, each had 5 nurses. Additional service, equivalent to the full time of one person, became available in each county by engaging local nurses from unemployment rolls. Throughout the paper, these individuals are referred to as C. W. A. nurses. The population load per nurse was about as follows: County A, 13,265; county B, 10,435; and county C, 6,810.

Basically the nursing service of the three counties operates along similar lines. It is designed to support the commonly accepted activities of a county health department in matters pertaining to the control of acute communicable diseases, and tuberculosis, and to the promotion of hygiene, especially for the maternity and child population. The approach used is one of education with actual nursing care being given only occasionally and then for demonstration purposes.

The record forms under consideration are those used by each nurse to describe the service and to guide her in the future handling of the clients. Records, such as those of clinic and school health work, which may portray joint activity of physician and nurse, and accounts of group activities are excluded. Since forms of the type under consideration were designed primarily for describing home visits, only conditions handled in this manner will be studied in relation to recording practice. No personal-record form had been provided for

[2] Recording of local health work. By W. Frank Walker and Caroline Randolph. The Commonwealth Fund, New York City, 1935.

Appraisal form for city health work, third edition, 1929. The American Public Health Association, New York City.

Appraisal form for rural health work, second edition, 1932, The American Public Health Association, New York City.

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Tabulation of health department services, Public Health Reports, vol. 51, no 36, Sept. 4, 1936. (Reprint No. 1768.)

miscellaneous work, such as social service and transportation of patients; hence, these activities are excluded.[3]

It may be well to emphasize that nurses in the study counties claimed to be following the methods of record keeping above described. They made a brief entry on the daily report for every individual who was the recipient of a personal service. A case card was also opened when the condition was considered of especial importance to the department, and under other circumstances if a continuing type of service was contemplated.

The analyses which follow are designed primarily to disclose differences between the amounts of service that were entered on the daily reports and on the individual case cards. Variations in findings are studied only to determine the possible influence of factors such as health department policy, condition for which service was rendered, frequency of visits, and the behavior of individual nurses on actual recording practice.

PROPORTION OF TOTAL CLIENTS INCLUDED ON CASE RECORDS

Home services in relation to maternity, tuberculosis, communicable disease, or health supervision were entered on the appropriate case records for 70 percent of the clients in counties A and C and for 60 percent in county B (table 1). Accordingly, if the quantity of home service should be measured by a count of case records alone, the nurses in these counties would receive credit for about two-thirds of their patients. Expressed in another way, services to one-third of the cases seen in the home would be lost if an appraisal or analysis of the work of these health departments were made according to the manner prescribed.[4]

The actual number of cases is, however, only a rough measure of the total volume of the nurse's service, for one case may have represented a temporary condition and have received a single visit, while another may have been seen on several occasions over a long period of time. Further analyses are indicated to elucidate such points as the proportion of services included on the individual case cards, the extent to which conditions of various types were entered on the appropriate records, and possible differences between the cases described on individual cards and those listed only on the daily report.

[3] In one of the counties, home visiting to school children for the correction of physical defects occasionally was recorded on school cards and not on separate case records, hence credit for these few visits is not given.

[4] See footnote 2.

TABLE 1.—*Number of cases visited by the nurses in each of 3 counties during a 12-month period and percentage of these on case records*

County	Total cases served	Percent on case records
County A	1,027	69.9
County B	2,620	60.3
County C	5,862	70.0

MATERNITY RECORDS

Under what contrasting circumstances were maternity records opened or omitted? The outstanding difference lay between cases first carried for antepartum or for postpartum service. In each of the counties case cards were opened for more than 90 percent of all persons receiving antepartum service, whereas this practice was followed for a much smaller percentage of those carried exclusively as postpartum cases (table 2).

TABLE 2.—*Number of antepartum and postpartum maternity cases visited by the nurses in each of 3 counties and percentage of these on case records*

Period of first contact with nurse	Total cases served			Percent on case records		
	County			County		
	A	B	C	A	B	C
Total	79	259	154	96.2	63.3	84.4
Antepartum	62	128	110	96.8	94.5	92.7
Postpartum only	17	131	44	94.1	32.8	63.6

The prenatal cases for which personal records were made differed from those entered only on a daily report principally in that they had more visits. Whereas only one case without a record had a second visit, about a third of the recorded cases in county B, slightly over a third in county A, and 43 percent in county C received as many as three or more visits.

As previously mentioned, the recording practice for maternity cases with postpartum visits only was not as complete or uniform as for cases with antepartum service. The wide variation between the counties in recording postpartum service seems to have been closely related to a difference in the use of the word "postpartum." According to common practice, the postpartum state is limited to a period which does not extend beyond 2 months after confinement; but it seems probable that services of a type which in the other counties would not have been considered as postpartum were so entered on the reports in county B. Most of the postnatal cases in counties A and C were visited within the first few weeks after confinement, while in county B 60 percent were visited during the second month after child-

birth. For persons given the initial visit during the first month after confinement, individual records were made out in equal proportions by counties B and C, while for those first visited during the second month of the postpartum period, case records were kept for nearly five times as many in county C as in county B.

In review, it seems that a study of the maternity records would have given a fair quantitative picture of prenatal service. The few cases which were entered only on the daily report, with a single exception, received only one visit. For maternity patients first visited during the postpartum period, individual records were seldom opened except when several visits were made.

TUBERCULOSIS RECORDS

Services to cases, suspects, contacts, and others visited in relation to tuberculosis were on the whole individually recorded for almost two-thirds of the clients. The percentages with case cards varied from 57 percent in counties B and C to 86 percent in county A. This variation between counties is surprising, since it is generally expected that individual records would have been prepared for all actual cases of tuberculosis, all suspects, and at least those contacts who were clearly associated with diagnosed cases.

With these differences in recording, the following questions arise: What types of individuals were entered on the case records? Was performance consistent in the three counties?

TABLE 3.—*Number of tuberculosis cases, suspects, contacts, and others visited by nurses and percentage of these on case records*

Classification of clients	Total clients served			Percent on case records		
	County			County		
	A	B	C	A	B	C
Total	224	568	131	86.2	57.4	56.5
Case	65	216	34	100.0	95.4	67.6
Suspect	89	70	35	87.6	88.6	51.4
Contact	56	212	53	83.9	27.4	58.5
Nontuberculous	0	39	0	(1)	0.0	(1)
Diagnosis unknown	14	31	9	21.4	0.0	22.2

1 Indeterminate.

The desirable practice of making an individual record for every case of tuberculosis was followed only in county A. Individual records were opened for over 95 percent of the patients listed as tuberculosis cases by county B nurses. The 10 cases entered only on the daily reports were unaccompanied by any specific information regarding the activities of the nurse. It seemed apparent, however, judging from the brevity of the entries and the lack of return visits, that a continuing type of service was neither given nor planned.

Considerable departure from the usual policy of recording actual cases of tuberculosis occured in county C, where 11, or approximately one-third, of the 34 actual cases served, were entered on the daily report only. According to notations on the report, these individuals were given the following services: Transportation to the tuberculosis clinic, information regarding the availability of sanatorium care, and delivery of messages. In contrast, when case records were opened, a more complete type of service was given.

Less frequently recorded than cases were those clients classed as suspects or contacts of tuberculosis. This was especially true in county B where about one-half of the suspects and contacts had individual records. The nurses in this county often visited homes solely to read tuberculin reactions on contacts. The result of the test may have been entered on the clinical record, but the visit appeared on the daily record only, thus accounting in part at least for the fact that only 27 percent of contacts had individual nursing records.

It seems evident that the nurse was more likely to open an individual case record when contemplating a continuing type of service. The proportion of clients with three or more visits who appeared on case records was larger than the proportion of those with one or even two visits. This statement applies to contacts, suspects, and cases in each of the three counties. Altogether there were 21 actual cases of tuberculosis without case records; and of these, only three received second visits.

Should the quantity of tuberculosis service in the three counties be measured by a count based on the individual case records, about 64 percent of the total persons served in the three counties would be included. In this group would be found more than 90 percent of the diagnosed cases. The proportion of visits included in the count would be higher than the proportion of individuals covered since patients with three or more visits were recorded on case cards with greater frequency than those receiving one or two visits.

COMMUNICABLE DISEASE RECORDS

Individual case records were opened for approximately 85 percent of the clients included in the communicable disease service. The proportions, however, differed widely for the three counties, as 71 percent of the clients in county A, 27 percent in county B, and 93 percent in county C were entered on case records. These percentages refer to all the beneficiaries of the communicable disease service, including actual cases, suspects, and contacts. The proportion of actual cases recorded is greater than the percentage of total clients with individual records, but even among the actual cases, the differences in the recording practices of the counties stand out (table 4).

TABLE 4.—*Number of communicable disease cases, suspects, and contacts visited by nurses and percentage of these on case records*

Classification of clients	Total clients served [1]			Percent on case records		
	County			County		
	A	B	C	A	B	C
Total	234	472	3,508	70.5	26.5	92.7
Case	194	202	3,347	71.6	59.4	97.0
Suspect	19	35	67	89.5	8.6	6.0
Contact	21	221	71	42.9	0.9	0
Unknown	0	14	23	(2)	0	0

[1] Excluding individuals served in the home for 2 or more communicable disease conditions during the year.
[2] Indeterminate.

For suspects and contacts the differences in recording practice are even more accentuated. The nurses of county A kept individual records for a higher percentage of persons suspected of having a communicable disease than for the actual cases. They also opened individual cards for 43 percent of those in contact with actual cases. Practice in the other two counties was decidedly different in that case records were opened for less than 10 percent of the suspects and for virtually none of the contacts.

In order to compensate for possible differences which disproportionate incidence of communicable diseases might make in a picture of recording practice, the cases were placed in four diagnostic categories. These categories were determined by the public health importance of the conditions and by the differences in administrative procedure. Scarlet fever, diphtheria, and typhoid fever were grouped together as diseases of a serious nature. Measles, whooping cough, mumps, and chicken pox were placed in the second group, principally because each health department seemed to have followed essentially the same policy with regard to the four diseases. Scabies, impetigo, ringworm, conjunctivitis, and similar minor infections formed the third group. Diseases rarely visited by the nurses were omitted.

TABLE 5.—*Distribution of cases of communicable disease according to disease classification and percentage in each grouping on case records*

Type of disease	Total cases served [1]			Percent on case records		
	County			County		
	A	B	C	A	B	C
Total	188	176	3,341	70.7	66.5	97.2
Diphtheria, scarlet fever, and typhoid fever cases	21	113	153	38.1	97.3	95.4
Measles, whooping cough, mumps, and chicken pox cases	112	21	3,126	74.1	14.3	99.0
Scabies and other minor infections	55	42	62	76.4	9.5	6.5

[1] Cases of certain diseases which were rarely visited by the nurses are excluded from this total.

It will be seen that communicable disease records were opened for most of the actual cases of the three major diseases registered for nursing service in counties B and C. In county A, however, 13 of the 21 cases visited were merely listed on the daily report as cases. Perhaps this practice reflects the influence of the health department's policy which limited the nurses' service to a maximum of two visits for major communicable diseases. The 7 cases without individual records in county C were visited only for quarantine release. Four were released on the first visit, and 3 had return visits for additional release cultures. In contrast, cases on records were usually quarantined or placarded and must therefore have been brought under the supervision of the nurse sufficiently early in the course of the disease for return visits to have been planned. The cases without individual records in the other counties were merely listed on the daily report with no information concerning services.

The greatest variation in the three nursing units was shown in recording cases of measles, whooping cough, mumps, and chicken pox. Ninety-nine percent of the 3,126 cases of these diseases had individual records in county C. In county A the proportion was also fairly high in that 74 percent of the 112 cases appear on separate cards, but in county B only 3 of 21 cases were handled in this manner.

The high proportion of cases of minor contagion with individual records in county C may be the result of a regulation of the State health department which required placarding and releasing in cases of measles and whooping cough as well as in other communicable diseases. Such regulations were not applied in the other two counties.

One difference between communicable disease clients for whom case records were opened and those listed only on the daily reports was consistent throughout; those with case records had a definitely larger number of visits. This was true for cases, suspects, and contacts in each of the foregoing disease classifications. Individual records were opened for every recipient of three or more visits in county A, for all but 9 in county C, and for all the actual cases in county B. In county A there were only two clients who received return visits for whom there were no case records. These two were diphtheria cases, and the purpose for which they were first visited was to release the family from quarantine.

In summary, approximately 85 percent of all communicable disease clients of the home nursing service had individual records; but there was extreme variation in recording practice of the three counties, both in regard to the type of client and in regard to the type of communicable disease. In one county, for instance, minor skin diseases were entered on individual case cards with greater frequency than were major communicable diseases, and suspects relatively more often than cases.

With such variations in recording practice, any count of the individual case records for communicable disease would include decidedly different types of cases for the several counties and varying proportions of the individuals visited. Consequently, if a comparison of procedures directed toward the control of communicable diseases should be based on a study of case cards alone, the results would be warped by dissimilarities of recording practice.

HEALTH SUPERVISION RECORDS

Health supervision case cards were opened for about half of the persons given home services other than maternity, tuberculosis, or communicable disease. The percentage with case records in each county was 58 for county A, 73 for county B, and 31 for county C (table 6).

TABLE 6.—*Number of cases given health supervision in the home and percentage on case records according to age groups*

Age group	Total number of cases			Percent on case records		
	County			County		
	A	B	C	A	B	C
Total	490	1,321	2,069	58 0	73 0	31 5
Infant	69	458	432	88 4	82 3	76 6
Preschool	89	589	386	60 7	85 7	16 3
School	223	169	966	44.4	35 5	18 2
Adult	109	105	285	64 2	21 0	28 8

The age of the individual seemed to be an important factor in determining whether or not a case record would be opened when a health supervisory visit was made. More than 75 percent of the infants visited in each county were entered on individual records; but for the other age groups the practice within the separate counties was very inconsistent. The percentage of preschool health supervision cases with individual record cards varied from 86 to 16. In county B, where the preschool services were most often recorded, adult hygiene services were least frequently entered on case cards. With such variations in recording, no comparable estimate of the relative amount of service rendered to the several age groups in the separate counties can be obtained from a count of the case cards.

Individual records were opened with greatest frequency, in each of the three counties, when a sustained type of service was contemplated. Those cases with return visits had a higher proportion of individual records than those with only one visit. This increase in individual recording with increase in number of visits occurred irrespective of age.

The recording practice of individual nurses within the specific counties was much more varied for the hygiene services than for the types of service discussed earlier in the paper. For other services the practice between counties differed, but, within the staffs, nurses followed about the same procedure. In relation to health supervision, however, the behavior of separate nurses was sufficiently variable to merit consideration. By referring to table 7 one may note wide individual differences, especially for county B. Even so, the contrast between counties B and C was greater than the contrast between specific members of each nursing staff.

TABLE 7.—*Variation in the recording practice of individual nurses for cases given health supervision in the home*

Nurses	Total number of cases[1]			Percent on case records		
	County			County		
	A	B	C	A	B	C
Health Department nurses:						
One	182	98	377	78 6	60 2	32.4
Two		167	331		65 9	35 3
Three		219	180		44 3	33 9
Four		99	369		43 4	27 6
Five		32	291		78 1	32 0
C. W A nurses	210	534	164	31 9	94.4	29 3

[1] Excluding clients served by more than 1 nurse.

In general, visits for health supervision appear on individual record cards less frequently than visits for any other of the services rendered by the nurses, and with less consistency. Approximately one-half of the individuals served had case cards. Services to infants were entered on individual records in slightly over three-fourths of the cases. Less of the preschool and still less of adult and school health supervision was included on the special cards. The individually recorded group included a large proportion of those cases with continued or repeated service, and this was consistently true regardless of other factors. According to these data, a count of the case cards would yield an index of the volume of service rendered infants, for approximately four-fifths of those served had case cards. But for the other ages no such index could be obtained because the recording practice in the three counties was so widely divergent that number of case cards has a different relation to the volume of the service in each.

SUMMARY

A consideration of record keeping for services in relation to maternity, tuberculosis, communicable disease, and health supervision by

the nurses of three representative county health departments showed that from 60 to 70 percent of all recipients of such services in the home were entered on individual case records. Briefly, it might be said that cases included on individual records were those most emphasized by the county health department program and those for whom a continuing type of service was initiated.

A count of case records for the three counties combined would have encompassed over 90 percent of the prenatal patients, about the same percentage of the actual cases of tuberculosis, and approximately 80 percent of the infants who received health supervision from the nurses. Maternity cases first seen in the postpartum period, tuberculosis suspects and contacts, and hygiene cases in the preschool, school, and adult age groups were included in the case records less frequently and in varying degrees—in some instances reaching as low as zero. The extent to which different types of communicable disease services were entered on case records in the separate counties varied widely, apparently being influenced by local policy. When comparisons could be made of recording practice in relation to specific services, the findings indicated that, as a rule, individuals without case records were visited for conditions of a transitory nature or were given services which, though happening on separate occasions, were incidental to the work of the physician, clinic, or hospital.

A considerably greater proportion of visits than of individuals would be included by a count of case records alone, since patients with three or more visits were entered on case cards with greater frequency than those receiving one or two visits.

The recording of various types of services, with the exception of health supervision work, was carried out in a similar manner by the nurses in each health department, thus indicating that the policy of the health department was a more important factor than behavior of the individual nurse in determining recording practice.

Unless the regulations governing reports are changed, nurses now find themselves in a situation where they may select either of two courses: They may, by assuming the risk of presenting only a part of their work, retain a system by which they are granted considerable latitude in choosing the cases and situations for which individual records are to be opened. The other alternative is to open a special record for every individual, irrespective of the necessity for such formality, and thus be assured of full credit for every service regardless of how trivial it may be.

REPORT ON MARKET-MILK SUPPLIES OF CERTAIN URBAN COMMUNITIES

Compliance of the Market-Milk Supplies of Certain Urban Communities With the Grade A Pasteurized and Grade A Raw Milk Requirements of the Public Health Service Milk Ordinance and Code (as Shown by Compliance (not Safety) Ratings of 90 Percent or More Reported by the State Milk-Sanitation Authorities During the Period July 1, 1935, to June 30, 1937)

The accompanying list gives the eighth semiannual revision of the list of certain urban communities in which the pasteurized market milk is both produced and pasteurized in accordance with the Grade A pasteurized milk requirements of the Public Health Service Milk Ordinance and Code, and in which the raw market milk sold to the final consumer is produced in accordance with the Grade A raw milk requirements of said ordinance and code, as shown by ratings of 90 percent or more reported by State milk-sanitation authorities.

These ratings are not a complete measure of safety, but represent the degree of compliance with the Grade A requirements of the Public Health Service Milk Ordinance and Code. Safety estimates should also take into account the percentage of milk pasteurized, which is given in the following tables.

The primary reason for publishing such lists from time to time is to encourage the communities of the United States to attain and maintain a high level of excellence in the public health control of milk supplies.

It is emphasized that the Public Health Service does not intend to imply that all communities not on the list are not provided with high-grade milk supplies. Some communities which have high-grade milk supplies are not included because arrangements have not been made for the determination of their ratings by the State milk-sanitation authority. In other cases the ratings which have been determined are now more than 2 years old and have therefore lapsed. In still other communities with high-grade milk supplies there seems, in the opinion of the community, to be no local necessity nor desire for rating or inclusion in the list, nor any reasonable local benefit to be derived therefrom.

The rules under which a community is included in this list are as follows:

(1) All ratings must have been determined by the State milk-sanitation authority in accordance with the Public Health Service rating method, based upon the Grade A pasteurized-milk and the Grade A raw milk requirements of the Public Health Service Milk Ordinance and Code.

(2) No community will be included in the list unless both its pasteurized milk and its raw milk ratings are 90 percent or more, provided

that communities in which only raw milk is sold will be included if the raw milk ratings are 90 percent or more.

(3) The rating used will be the latest rating submitted to the Public Health Service, but no rating will be used which is more than 2 years old.

(4) Occasional surprise checks will be made of the rating methods used by the State, and discounts will be applied if State ratings are found to be more than 5 percent too high.

Communities are urgently advised to bring their ordinances up to date at least every 5 years, since ratings will be made on the basis of later editions if those adopted locally are more than 5 years old.

Communities which are not now on the list and desire to be rated should request the State milk-sanitation authority to determine their ratings and, if necessary, should improve their status sufficiently to merit inclusion in the list.

Communities which are now on the list should not permit their ratings to lapse, as ratings more than 2 years old cannot be used.

Communities which have not adopted the Public Health Service Milk Ordinance may wish to give thoughtful consideration to the advisability of doing so. It is obviously easier to satisfy the requirements upon which the rating method is based if these are included in the local legislation.

Communities which are enforcing the Public Health Service Milk Ordinance, but which have not yet been admitted to the list, should determine whether this has been the result of failure to enforce the ordinance strictly or failure to bring the ordinance up to date.

State milk sanitation authorities which are not now equipped to determine municipal ratings are urged, in fairness to their communities, to equip themselves as soon as possible. The personnel required is small, as in most States one milk specialist is sufficient for the work.

The inclusion of a community in this list means that the pasteurized milk sold in the community, if any, is of such a degree of excellence that the weighted average of the percentages of compliance with the various items of sanitation required for Grade A pasteurized milk is 90 percent or more and that, similarly, the raw milk sold in the community, if any, so nearly meets the requirements that the weighted average of the percentages of compliance with the various items of sanitation required for Grade A raw milk is 90 percent or more. However, high-grade pasteurized milk is safer than high-grade raw milk, because of the added protection of pasteurization. To secure this added protection, those who are dependent on raw milk can pasteurize the milk at home in the following simple manner: Place the milk in an aluminum vessel on a hot flame and heat to 155° F., stirring constantly; then immediately set the vessel in cold water and continue stirring until cool.

TABLE 1.—*Communities in which all market milk is pasteurized. In these communities market milk complies with the Grade A pasteurized milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by pasteurized milk ratings of 90 percent or more*[1]

Community	Percentage of milk pasteurized	Date of rating
MINNESOTA		
Winona	100	Oct. 30, 1936
NORTH CAROLINA		
Greenville	100	Dec. 16, 1936
Princeville	100	Nov. 12, 1936
Sanford	100	June 22, 1937
Tarboro	100	Nov 12, 1936

[1] Note particularly the percentage of milk pasteurized in the various communities listed in these tables. This percentage is an important factor to consider in estimating the safety of a city's milk supply.

TABLE 2.—*Communities in which some market milk is pasteurized. In these communities the pasteurized market milk complies with the Grade A pasteurized milk requirements and the raw market milk complies with the Grade A raw milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by pasteurized and raw milk ratings, respectively, of 90 percent or more*[1]

[NOTE.—All milk should be pasteurized or boiled, either commercially or at home, before it is consumed. See text for home method.]

Community	Percentage of milk pasteurized	Date of rating
ALABAMA		
Huntsville	82	Dec. 16, 1936.
Montgomery	27	Dec. 4, 1936.
Tuscaloosa	77	Dec. 13, 1935.
ARKANSAS		
Eldorado	32	October 1936.
Fort Smith	28	June 1937.
Jonesboro	20	Do
Little Rock	33	November 1936.
Pine Bluff	31	June 1937.
Texarkana	39	Do.
FLORIDA		
Coral Gables	89	May 1937.
Fort Lauderdale	64	Do.
Miami	89	Do.
ILLINOIS		
Chicago	99.7	Jan. 22, 1937.
KANSAS		
Junction City	31	June 1936.
Lawrence	48	May 1936.
Topeka	59	Do.
Wichita	58	December 1935.
KENTUCKY		
Ashland	86	June 1936.
Bowling Green	48	April 1937.
Glasgow	67	Do.
Henderson	34	May 1936.
Louisville	96	March 1936.
MINNESOTA		
Albert Lea	97	Oct. 23, 1936.
Little Falls	55	Oct. 23, 1935.
MISSISSIPPI		
Greenville	26	Aug. 20, 1935.
McComb	8	Jan 9, 1936.
MISSOURI		
Columbia	41	Mar 3, 1936.
Hannibal	31	May 29, 1936.
Moberly	49	May 1, 1936
Sedalia	20	Apr. 10, 1936.
NEW MEXICO		
Las Cruces	53	Nov. 13, 1935.
NORTH CAROLINA		
Bryson City	50	Jan 19, 1937
Charlotte	34	June 10, 1937.
Clinton	29	Dec 17, 1936.
Durham	89	Apr 3, 1937.
Fayetteville	52	Sept. 30, 1936.
Franklin	68	Jan 20, 1937.
Hope Mills	40	Sept 30, 1936.
Kinston	16	Apr 10, 1936.
Morehead City	61	Dec 3, 1936
Oxford	7	May 20, 1937.
Rocky Mount	35	Dec. 19, 1936.
OKLAHOMA		
Bartlesville	32	Mar. 20, 1936.
Blackwell	48	June 3, 1936.
Muskogee	59	January 1936.
Oklahoma City	70	December 1935.
Okmulgee	57	June 25, 1937.
Tulsa	72	Apr 22, 1937.
OREGON		
Astoria	59	June 5, 1937.
Portland	77	October 1936.

[1] Note particularly the percentage of milk pasteurized in the various communities listed in these tables. This percentage is an important factor to consider in estimating the safety of a city's milk supply.

TABLE 2.—*Communities in which some market milk is pasteurized. In these communities the pasteurized market milk complies with the Grade A pasteurized milk requirements and the raw market milk complies with the Grade A raw milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by pasteurized and raw milk ratings, respectively, of 90 percent or more* [1]—Continued

[NOTE.—All milk should be pasteurized or boiled, either commercially or at home, before it is consumed. See text for home method.]

Community	Percentage of milk pasteurized	Date of rating
TENNESSEE		
Dyersburg	21	May 13, 1937
Knoxville	69	Apr 16, 1937.
Memphis	84	June 3, 1937.
Union City	33	May 21, 1936.
TEXAS		
Abilene	77	Mar. 17, 1937
Amarillo	62	July 3, 1937
Austin	35	Dec 19, 1935.
Ballinger	50	Mar 2, 1936.
Beaumont	52	June 1937.
Big Spring	27	Mar. 22, 1937.
Brownwood	17	June 26, 1936
Corsicana	19	Mar 12, 1937
Dallas	75	May 3, 1937.
El Paso	69	Apr 7, 1937
Fort Worth	80	February 1937.
Gainesville	46	Sept 6, 1935
Galveston	75	August 1936.
Kerrville	72	May 8, 1936
Livingston	20	March 1936.
Lubbock	32	July 10, 1935
TEXAS—contd.		
Midland	51	Mar. 23, 1937.
Port Arthur	41	June 1937
San Angelo	60	Apr 17, 1937.
San Antonio	70	Apr 16, 1937.
Seguin	51	June 8, 1937.
Sweetwater	53	Mar 18, 1937.
Texarkana	41	Mar. 24, 1937.
Tyler	60	January 1936.
Victoria	13	February 1936.
Waco	31	Sept. 20, 1935.
Wichita Falls	79	May 26, 1936.
VIRGINIA		
Pulaski	39	May 28, 1937.
WASHINGTON		
Vancouver	31	Oct 9, 1936.
WEST VIRGINIA		
Huntington	43	Aug 5, 1936.

[1] Note particularly the percentage of milk pasteurized in the various communities listed in these tables This percentage is an important factor to consider in estimating the safety of a city's milk supply

TABLE 3.—*Communities in which no market milk is pasteurized, but in which the raw market milk complies with the Grade A raw milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by raw milk ratings of 90 percent or more* [1]

[NOTE.—All milk should be pasteurized or boiled, either commercially or at home, before it is consumed. See text for home method]

Community	Date of rating
ALABAMA	
Demopolis	Nov. 22, 1935.
Scottsboro	Dec 31, 1935.
Stevenson	Dec 31, 1935.
Sylacauga	Dec 6, 1935.
Talladega	Dec. 6, 1935.
York	Nov. 20, 1935
KANSAS	
Horton	Sept 1, 1936.
Sabetha	Sept. 25, 1936
MISSISSIPPI	
Brookhaven	May 31, 1937.
Durant	June 9, 1937.
Magnolia	Jan. 10, 1936
Ocean Springs	Sept 5, 1935
Pascagoula	Sept 5, 1935.
Yazoo City	June 8, 1937.
MISSOURI	
Ash Grove	July 9, 1936.
NORTH CAROLINA	
Ahoskie	June 25, 1937.
Angier	May 18, 1936
Aulander	June 24, 1937.
Buies Creek	Nov. 9, 1936.
Canton	June 29, 1937.
Cary	Apr 23, 1936.
Coats	May 18, 1936.
Dunn	May 18, 1936.
Erwin	May 18, 1936.
Fairmont	May 28, 1936.
Lillington	Nov 9, 1936.
Lumberton	May 28, 1936.
North Wilkesboro	Nov 11, 1936.
Pinehurst	Nov. 7, 1936.
Raeford	May 29, 1936.
Red Springs	May 28. 1936.

[1] Note particularly the percentage of milk pasteurized in the various communities listed in these tables. This percentage is an important factor to consider in estimating the safety of a city's milk supply.

TABLE 3.—*Communities in which no market milk is pasteurized, but in which the raw market milk complies with the Grade A raw milk requirements of the Public Health Service Milk Ordinance and Code to the extent shown by raw milk ratings of 90 percent or more* [1]—Continued.

[NOTE.—All milk should be pasteurized or boiled, either commercially or at home, before it is consumed. See text for home method.]

Community	Date of rating	Community	Date of rating
NORTH CAROLINA—continued		TEXAS	
		Brenham	June 11, 1936.
Roanoke Rapids	Apr 6, 1936.	Bryan	May 1936.
Southern Pines	Nov 11, 1936.	Canyon	July 15, 1937.
Southport	Oct 2, 1935	Childress	Apr 17, 1936.
Spindale	June 30, 1937.	Colorado	Mar 19, 1937.
Sylva	June 21, 1937	Commerce	Mar 16, 1937.
Washington	Sept. 26, 1935.	Crockett	May 1936
Whiteville	Dec. 18, 1936	Del Rio	June 8, 1937.
Williamston	Nov 19, 1936	Jacksonville	Jan 1936.
Wilkesboro	Nov 11, 1936		
Windsor	June 24, 1937.	WASHINGTON	
Winton	June 25, 1937.	Camas	Oct 9, 1936.
TENNESSEE			
Alcoa	July 3, 1935.		
Jonesboro	June 24, 1937.		
Savannah	June 15, 1937		

[1] Note particularly the percentage of milk pasteurized in the various communities listed in these tables. This percentage is an important factor to consider in estimating the safety of a city's milk supply

DEATHS DURING WEEK ENDED JULY 17, 1937

(From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce)

	Week ended July 17, 1937	Corresponding week, 1936
Data from 86 large cities of the United States		
Total deaths	8,933	12,183
Average for 3 prior years	7,781	
Total deaths, first 28 weeks of year	258,089	259,038
Deaths under 1 year of age	584	651
Average for 3 prior years	543	
Deaths under 1 year of age, first 28 weeks of year	16,161	16,107
Data from industrial insurance companies		
Policies in force	70,073,939	68,609,012
Number of death claims	12,283	16,631
Death claims per 1,000 policies in force, annual rate	9 1	8 1
Death claims per 1,000 policies, first 28 weeks of year, annual rate	10 5	10 4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 24, 1937, and July 25, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 24, 1937	Week ended July 25, 1936	Week ended July 24, 1937	Week ended July 25, 1936	Week ended July 24, 1937	Week ended July 25, 1936	Week ended July 24, 1937	Week ended July 25, 1936
New England States:								
Maine	1	1			14	30	0	0
New Hampshire		3	1		3	2	0	0
Vermont	1				7	7	0	0
Massachusetts	9	8			85	272	2	2
Rhode Island	1	2			19	5	0	0
Connecticut	10		1		17	32	0	0
Middle Atlantic States:								
New York	21	27	[1] 6	[1] 2	325	354	5	10
New Jersey	3	7		1	183	165	0	0
Pennsylvania [3]	23	10			787	234	2	6
East North Central States:								
Ohio	6	5	4	7	127	50	6	1
Indiana	2	12	8	15	56	4	0	2
Illinois [2]	28	21	6	3	167	13	0	5
Michigan	14	13			115	19	1	1
Wisconsin	5		1	20	44	52	2	0
West North Central States:								
Minnesota	1	4			8	7	0	0
Iowa [2]	7	4	1		7		1	0
Missouri	5	5	22	6	42	5	1	0
North Dakota			5			4	0	0
South Dakota		1			1	1	0	1
Nebraska	1	1			7	5	1	1
Kansas	4	2	3		8	4	0	0
South Atlantic States:								
Delaware		1			2	2	0	0
Maryland [2, 3]	5	9	1	1	13	77	2	5
District of Columbia	8	2		1	20	38	0	1
Virginia [2]	8	4			54	42	6	2
West Virginia	2	5	12		35	4	1	0
North Carolina [2, 4]	15	14		1	75	3	4	0
South Carolina [4]		4	38	19	19	2	1	0
Georgia [4]	7	10					1	0
Florida [4]	2	3	1	3			0	4

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 24, 1937, and July 25, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 24, 1937	Week ended July 25, 1936	Week ended July 24, 1937	Week ended July 25, 1936	Week ended July 24, 1937	Week ended July 25, 1936	Week ended July 24, 1937	Week ended July 25, 1936
East South Central States:								
Kentucky	2	4	3	2	58	27	2	10
Tennessee [2, 4]	5	11	1	9	99	8	2	0
Alabama [4]	8	7	9		6	8	2	2
Mississippi [3]	8	7					0	0
West South Central States								
Arkansas	3	3	3	5	6		0	0
Louisiana [4]	7	9	6	5	2	6	1	2
Oklahoma [5]	5	5	5	2	17	1	1	0
Texas [4]	28	17	39	23	104	34	0	0
Mountain States:								
Montana	1				4	5	1	0
Idaho		1	6	2	12	10	1	0
Wyoming [6]					5		0	0
Colorado	2	1			20	2	1	0
New Mexico	2	5		1	100	32	0	1
Arizona	1	3	10	10	7	20	0	2
Utah [3]			1		43	7	0	0
Pacific States:								
Washington		1			24	52	0	1
Oregon	2		13	5	7	8	1	0
California	18	26	4	6	47	155	2	8
Total	281	278	210	149	2,801	1,808	50	67
First 29 weeks of year	12,525	13,573	273,534	139,344	235,831	264,233	3,921	5,636

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 24, 1937	Week ended July 25, 1936	Week ended July 24, 1937	Week ended July 25, 1936	Week ended July 24, 1937	Week ended July 25, 1936	Week ended July 24, 1937	Week ended July 25, 1936
New England States:								
Maine	4	1	5	9	0	0	0	0
New Hampshire	1	0	1		0	0	1	0
Vermont	0	0		5	0	0	0	1
Massachusetts	10	1	38	47	0	0	6	25
Rhode Island	0	0	8	6	0	0	0	2
Connecticut	0	1	7	7	0	0	3	3
Middle Atlantic States:								
New York	8	6	66	120	0	0	9	14
New Jersey	1	1	24	26	0	0	5	2
Pennsylvania [2]	0	3	114	100	0	0	16	10
East North Central States:								
Ohio	20	1	34	44	1	0	18	6
Indiana	7	2	29	31	7	0	4	2
Illinois [2]	11	7	102	80	10	6	22	11
Michigan	4	6	130	76	7	1	2	5
Wisconsin	2	0	56	75	2	5	1	3
West North Central States:								
Minnesota	1	0	21	25	10	3	1	0
Iowa [2]	3	0	31	19	52	28	3	0
Missouri	16	0	38	13	0	5	21	15
North Dakota	0	0	1	3	6	1	5	2
South Dakota	0	0	11	6	1	1	0	0
Nebraska	4	0	2	12	0	0	0	1
Kansas	4	2	17	32	14	0	30	3
South Atlantic States:								
Delaware	0	0	1	2	0	0	1	0
Maryland [2, 3]	1	0	8	13	0	0	16	1
District of Columbia	0	0	3	5	0	0	2	2
Virginia [2]	1	0	7	7	0	0	28	18
West Virginia	1	1	11	11	1	0	8	9
North Carolina [2, 4]	9	0	8	15	1	0	25	23
South Carolina [4]	1	0	10		0	0	11	9
Georgia [4]	3	2	5	5	0	0	43	35
Florida [4]	0	0	1	1	0	0	8	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 24, 1937, and July 25, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 24, 1937	Week ended July 25, 1936	Week ended July 24, 1937	Week ended July 25, 1936	Week ended July 24, 1937	Week ended July 25, 1936	Week ended July 24, 1937	Week ended July 25, 1936
East South Central States:								
Kentucky	18	2	14	13	0	0	47	29
Tennessee [2] [4]	[7] 10	17	12	9	0	0	53	52
Alabama [4]	1	39	2	10	0	0	12	20
Mississippi [3]	13	3	7	3	1	0	23	16
West South Central States:								
Arkansas	48	0	7	3	0	0	50	14
Louisiana [4]	7	1	3	4	0	0	33	37
Oklahoma [5]	53	0	18	3	0	0	30	33
Texas [4]	31	0	37	16	0	0	85	47
Mountain States:								
Montana	1	1	5	13	2	10	1	2
Idaho	0	1	8	3	17	2	0	0
Wyoming [6]	1	0	3	6	0	0	1	0
Colorado	3	0	5	7	1	0	1	6
New Mexico	2	1	9	5	0	0	2	18
Arizona	2	0	1	1	0	0	4	0
Utah [3]	0	0	7	5	0	0	0	1
Pacific States:								
Washington	0	3	8	10	0	2	2	2
Oregon	1	0	10	16	2	0	4	5
California	21	15	57	67	1	0	12	6
Total	324	117	1,002	998	136	64	647	491
First 29 weeks of year	1,670	894	161,216	174,878	7,693	5,767	5,486	5,018

[1] New York City only

[2] Rocky Mountain spotted fever, week ended July 24, 1937, 14 cases, as follows: Pennsylvania, 1; Illinois, 2; Iowa, 1; Maryland, 2, Virginia, 4, North Carolina, 3, Tennessee, 1.

[3] Week ended earlier than Saturday

[4] Typhus fever, week ended July 24, 1937, 78 cases, as follows: North Carolina, 2; South Carolina, 2; Georgia, 32; Florida, 2, Tennessee, 3, Alabama, 17, Louisiana, 1, Texas, 19.

[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa

[6] Colorado tick fever, week ended July 24, 1937, Wyoming, 1 case.

[7] 1 nonparalytic case included.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June 1937										
Hawaii Territory		17	49		1,236		0		0	7
Illinois	10	133	65	12	2,072	2	3	1,353	71	34
Indiana	7	29	38	2	2,148		1	320	61	12
Kansas	4	36	5	1	79	1	6	224	24	11
Louisiana	7	54	80	146	25	27	13	39	1	71
Maryland	8	18	3		612	3	0	80	0	31
Massachusetts	13	15			2,356	2	6	725	0	5
Montana		1	142		32	1	0	62	95	9
Nevada					17		1	7	0	0
New York	28	159		12	6,109		9	1,926	0	52
Oklahoma	1	12	35	75	149	21	28	41	8	49
Rhode Island	5	6			274		0	144	0	3
South Dakota	1	6			11		0	71	10	2
Texas	17	132	495	2,579	1,267	226	14	301	16	106
Virginia	25	30	43	24	788	10	6	25	0	37
Washington	4	9	8		290		1	102	6	8

Summary of monthly reports from States—Continued

June 1937

	Cases
Actinomycosis:	
Illinois	1
Anthrax:	
Massachusetts	2
Texas	1
Chicken pox:	
Hawaii Territory	73
Illinois	1,487
Indiana	139
Kansas	71
Louisiana	1
Maryland	289
Massachusetts	1,512
Montana	85
Nevada	11
New York	3,257
Oklahoma	20
Rhode Island	73
South Dakota	25
Texas	403
Virginia	125
Washington	469
Dengue:	
Texas	13
Diarrhea:	
Kansas	1
Maryland	21
Dysentery:	
Illinois (amoebic)	5
Illinois (amoebic carriers)	13
Illinois (bacillary)	10
Indiana (amoebic)	1
Kansas (amoebic)	2
Kansas (bacillary)	1
Louisiana (amoebic)	14
Louisiana (bacillary)	2
Maryland (bacillary)	21
Massachusetts (bacillary)	1
New York (amoebic)	2
New York (bacillary)	24
Oklahoma (amoebic)	2
Oklahoma (bacillary)	30
Texas (bacillary)	358
Virginia (diarrhea included)	775
Washington (amoebic)	1
Encephalitis, epidemic or lethargic:	
Illinois	5
Kansas	2
Louisiana	1
Maryland	4
Massachusetts	1
New York	6
Texas	6
Washington	4
German measles:	
Illinois	63
Kansas	3
Maryland	22
Massachusetts	153
Montana	3
New York	257
Rhode Island	13
Washington	16
Hookworm disease:	
Hawaii Territory	74
Louisiana	40
Impetigo contagiosa:	
Hawaii Territory	12
Maryland	4
Impetigo contagiosa—Con.	
Montana	2
Oklahoma	1
Washington	1
Jaundice, infectious:	
Hawaii Territory	4
Lead poisoning:	
Massachusetts	3
Leprosy:	
Hawaii Territory	2
Illinois	1
Louisiana	1
Mumps:	
Hawaii Territory	46
Illinois	920
Indiana	73
Kansas	289
Louisiana	2
Maryland	220
Massachusetts	463
Montana	97
Oklahoma	23
Rhode Island	4
South Dakota	2
Texas	584
Virginia	229
Washington	396
Ophthalmia neonatorum:	
Illinois	2
Indiana	1
Massachusetts	91
Montana	1
New York [1]	11
Rhode Island	3
Paratyphoid fever:	
Hawaii Territory	3
Illinois	3
Kansas	1
Louisiana	2
Maryland	1
Massachusetts	51
New York	6
Texas	11
Washington	1
Puerperal septicemia:	
Washington	3
Rabies in animals:	
Illinois	31
Indiana	44
Louisiana	19
Massachusetts	19
New York [1]	4
Rhode Island	2
Texas	8
Washington	22
Rabies in man:	
Illinois	1
Relapsing fever:	
Kansas	1
Rocky Mountain spotted fever:	
Maryland	9
Montana	10
Nevada	3
New York	1
Virginia	7
Septic sore throat:	
Illinois	4
Kansas	3
Louisiana	1
Maryland	14
Massachusetts	8
Montana	5
New York	55
Septic sore throat—Con.	
Oklahoma	8
Rhode Island	18
Virginia	6
Washington	2
Tetanus:	
Hawaii Territory	2
Illinois	2
Kansas	3
Louisiana	2
Massachusetts	3
New York	3
Oklahoma	4
Washington	1
Trachoma:	
Hawaii Territory	1
Illinois	57
Massachusetts	1
Montana	151
Oklahoma	2
South Dakota	9
Trichinosis:	
Illinois	3
Massachusetts	1
New York	16
Tularaemia:	
Illinois	2
Kansas	1
Louisiana	1
Maryland	1
Montana	1
Texas	1
Virginia	8
Typhus fever:	
Hawaii Territory	1
Indiana	1
Louisiana	1
Maryland	1
New York	4
Texas	44
Undulant fever:	
Illinois	11
Kansas	8
Louisiana	7
Maryland	3
Massachusetts	5
Montana	1
New York	18
Oklahoma	8
Texas	8
Virginia	3
Washington	1
Vincent's infection:	
Illinois	45
Kansas	3
Maryland	10
New York [1]	69
Whooping cough:	
Hawaii Territory	15
Illinois	643
Indiana	297
Kansas	527
Louisiana	80
Maryland	487
Massachusetts	993
Montana	81
Nevada	1
New York	1,745
Oklahoma	86
Rhode Island	214
South Dakota	12
Texas	1,392
Virginia	446
Washington	283

[1] Exclusive of New York City.

WEEKLY REPORT FROM CITIES

City reports for week ended July 17, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	139	42	14	1,666	324	525	8	392	79	1,306	-------
Current week [1]	90	31	8	1,331	401	357	4	406	60	1,466	-------
Maine:											
Portland	0	------	0	4	3	1	0	0	0	0	27
New Hampshire:											
Concord	0	------	0	0	2	0	0	0	0	0	8
Nashua	1	------	------	0	------	0	0	------	0	0	6
Vermont											
Barre	0	------	0	0	0	0	0	0	0	0	2
Burlington	0	------	0	0	0	0	0	0	0	0	4
Rutland	0	------	0	0	0	0	0	0	0	0	5
Massachusetts:											
Boston	0	------	0	32	31	13	0	5	0	48	263
Fall River	0	------	0	5	1	5	0	2	0	9	42
Springfield	0	------	0	0	1	3	0	0	1	12	36
Worcester	0	------	0	1	7	0	0	4	0	9	52
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	17
Providence	0	------	0	6	4	7	0	3	0	18	85
Connecticut:											
Bridgeport	0	------	0	2	2	2	0	0	0	8	34
Hartford	0	------	0	19	3	3	0	1	0	1	48
New Haven	0	------	0	0	1	0	0	1	0	0	29
New York:											
Buffalo	0	------	0	21	4	3	0	3	0	40	97
New York	21	5	2	287	109	34	0	91	6	96	2,038
Rochester	0	------	0	4	1	0	0	1	0	28	70
Syracuse	0	------	0	12	1	6	0	2	0	30	50
New Jersey:											
Camden	0	------	0	2	1	1	0	0	1	2	31
Newark	0	------	0	0	7	1	0	8	16	0	120
Trenton	0	------	0	18	1	3	0	4	0	0	42
Pennsylvania:											
Philadelphia	3	------	0	9	17	20	0	36	7	55	603
Pittsburgh	3	2	1	128	16	5	0	4	0	50	-------
Reading	0	------	0	10	3	3	0	0	0	0	29
Ohio:											
Cincinnati	1	------	0	10	7	1	0	9	1	44	126
Cleveland	1	4	0	172	5	24	0	15	0	39	204
Columbus	0	------	0	2	0	0	0	0	0	12	72
Toledo	2	2	1	45	0	2	0	2	0	72	77
Indiana:											
Anderson	0	------	0	4	0	0	0	0	0	6	9
Fort Wayne	0	------	0	0	1	1	0	0	0	0	23
Indianapolis	0	------	0	21	2	2	0	0	0	25	95
Muncie	0	------	0	3	0	1	0	1	0	4	15
South Bend	0	------	0	0	0	0	0	0	0	0	12
Terre Haute	1	------	0	0	0	2	0	0	0	0	11
Illinois:											
Alton	0	------	0	0	0	1	0	0	0	0	10
Chicago	10	2	2	209	18	54	0	42	1	111	658
Elgin	0	------	0	0	0	0	0	0	0	5	6
Moline	0	------	0	0	0	1	0	0	0	16	8
Springfield	0	------	0	5	1	0	0	0	0	2	15
Michigan:											
Detroit	9	------	0	58	9	40	0	26	1	79	244
Flint	------	------	------	------	------	------	------	------	------	------	-------
Grand Rapids	0	------	0	15	4	5	0	0	0	19	44
Wisconsin:											
Kenosha	0	------	0	2	0	0	0	0	0	0	8
Madison	0	------	0	2	0	2	0	1	0	5	28
Milwaukee	0	------	0	14	6	14	0	3	1	46	107
Racine	0	------	0	0	0	1	0	0	0	0	11
Superior	0	------	0	0	0	1	0	0	0	0	4

[1] Figures for Flint, Mich., estimated; report not received.

City reports for week ended July 17, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Minnesota:											
Duluth	0	------	0	1	0	3	0	0	0	9	18
Minneapolis	0	------	0	2	3	3	0	1	0	4	93
St. Paul	0	------	0	0	4	1	0	2	0	40	67
Iowa:											
Cedar Rapids	0	------	--------	1	-------	2	0	-----	0	3	--------
Des Moines	1	------	--------	2	-------	5	0	------	0	0	29
Sioux City	0	---	-----	0	-------	3	0	------	0	0	--------
Waterloo	0	------	--------	2	-------	0	0	------	0	2	--------
Missouri:											
Kansas City	1	------	0	1	5	5	1	4	0	6	78
St. Joseph	0	------	0	0	0	0	0	1	0	2	18
St. Louis	9	------	0	27	4	21	0	16	3	25	202
North Dakota:											
Fargo	0	----	0	0	1	0	1	1	0	38	13
Grand Forks	0	-----	-----	0	-----	0	0	----	0	1	--------
Minot	0	----	0	0	0	0	1	0	0	0	6
South Dakota:											
Sioux Falls	0	---	0	0	0	0	0	0	0	0	9
Nebraska:											
Omaha	0	------	0	1	6	3	0	1	0	6	55
Kansas:											
Lawrence	0	0	0	0	0	1	0	0	0	6	--------
Toepka	0	----	0	0	2	3	0	0	0	18	19
Wichita	0	---	0	2	4	0	0	0	0	11	17
Delaware:											
Wilmington	0	------	0	0	1	0	0	1	1	9	29
Maryland:											
Baltimore	1	2	0	22	11	5	0	12	5	96	270
Cumberland	0	---	0	0	0	0	0	0	0	1	14
Frederick	0	---	0	0	0	0	0	0	0	0	4
District of Columbia:											
Washington	2	------	0	33	7	4	0	16	4	14	183
Virginia:											
Lynchburg	1	---	0	0	1	0	0	0	0	17	9
Norfolk	0	---	0	0	3	1	0	0	0	0	35
Richmond	0	---	0	7	2	2	0	0	0	1	48
Roanoke	0	---	0	4	2	0	0	0	3	2	28
West Virginia:											
Charleston	0	-----	0	0	3	0	0	1	0	0	33
Huntington	0	--	----	1	---	3	0	----	0	0	------
Wheeling	0	------	0	2	1	2	0	2	0	5	21
North Carolina:											
Gastonia	0	-----	---	0	-	0	0	---	0	0	------
Raleigh	0	---	0	1	0	0	0	0	1	0	11
Wilmington	1	----	0	0	1	0	0	0	0	9	9
Winston-Salem	0	------	0	1	2	0	0	2	0	0	18
South Carolina:											
Charleston	0	-----	0	0	4	0	0	2	0	0	29
Florence	0	--	0	0	0	0	0	0	0	0	15
Greenville	0	----	0	0	0	0	0	0	0	9	2
Gerogia:											
Atlanta	2	---		1	8	4	0	2	2	17	61
Brunswick	0	---	0	0	0	0	0	0	0	1	-----
Savannah	0	------	0	0	1	0	0	3	2	0	29
Florida:											
Miami	0	-----	0	1	3	0	0	0	0	0	25
Tampa	1	------	0	5	2	0	0	1	0	8	33
Kentucky:											
Ashland	0	----	----	11	--	0	0	-----	0	6	1
Covington	0	-----	0	3	0	1	0	0	0	4	13
Lexington	0	-----	0	0	0	1	0	2	0	10	19
Louisville	1	-----	0	23	9	7	0	7	0	59	93
Tennessee:											
Knoxville	0	2	0	0	0	0	0	0	2	0	35
Memphis	0	--	1	27	4	0	0	8	2	22	80
Nashville	0	----	0	3	2	2	0	0	0	21	56
Alabama:											
Birmingham	0	5	0	10	3	0	0	6	3	6	65
Mobile	0	-----	0	0	5	0	0	0	0	2	28
Montgomery	0	1	------	0	------	1	0	-------	3	12	--------
Arkansas:											
Fort Smith	0	------	------	0	-------	0	0	-----	2	0	--------
Little Rock	0	------	0	0	4	1	0	5	1	0	12

City reports for week ended July 17, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Louisiana:											
Lake Charles	0		0	0	0	0	0	0	0	0	8
New Orleans	2	4	0	2	2	1	0	9	5	10	129
Shreveport	0		0	0	3	0	0	0	0	2	31
Oklahoma:											
Muskogee	0		0	0	0	0	0	0	0	0	0
Oklahoma City	0		0	0	6	1	0	1	0	0	49
Tulsa	0			3		1	0		0	22	
Texas:											
Dallas	1		0	3	3	1	0	3	1	28	66
Fort Worth	0		0	0	1	3	0	1	1	15	42
Galveston	0		0	0	1	0	0	1	0	0	21
Houston	3		0	1	0	3	0	1	2	3	64
San Antonio	0		0	0	2	1	0	7	0	1	58
Montana:											
Billings	0		0	0	0	0	0	0	0	1	11
Great Falls	0		0	0	0	0	0	0	0	6	6
Helena	0		0	1	0	0	2	0	0	0	2
Missoula	0		0	0	0	0	0	0	0	0	5
Idaho:											
Boise	0		0	0	0	0	0	0	0	2	1
Colorado:											
Colorado Springs	0		0	0	1	1	0	0	0	0	9
Denver	0		1	33	5	1	0	2	1	14	69
Pueblo	0		0	0	0	1	0	1	0	1	11
New Mexico:											
Albuquerque	0		0	1	0	0	0	0	0	0	
Utah:											
Salt Lake City	0		0	30	3	4	0	1	1	7	29
Washington:											
Seattle	3		0	9	2	0	0	4	0	48	83
Spokane	1		0	18	0	2	0	0	0	21	19
Tacoma	0		0	0	1	0	0	1	0	9	22
Oregon:											
Portland	0		0	1	6	3	0	1	0	3	97
Salem	0			0		0	0		0	1	
California:											
Los Angeles	11	6	1	8	11	12	0	18	2	69	270
Sacramento	1		0	4	1	2	0	3	1	10	29
San Francisco	0	1	0	3	2	10	0	7	1	46	141

City reports for week ended July 17, 1937—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths	
Maine:			
Portland	1	0	0
Massachusetts:			
Boston	1	1	1
Fall River	0	0	1
New York:			
Buffalo	1	0	0
New York	6	4	5
Pennsylvania:			
Philadelphia	0	0	1
Pittsburgh	2	1	0
Ohio:			
Cincinnati	1	0	7
Cleveland	1	0	1
Illinois:			
Chicago	2	2	3
Michigan:			
Detroit	0	0	1
Minnesota:			
Minneapolis	0	0	1
Missouri:			
Kansas City	0	0	2
St. Louis	1	0	0
Nebraska:			
Omaha	0	0	4
Maryland:			
Baltimore	2	2	0
West Virginia:			
Huntington	1	0	0
North Carolina:			
Wilmington	1	1	0
Georgia:			
Atlanta	1	0	0
Kentucky:			
Lexington	1	1	0
Louisville	0	0	1
Tennessee:			
Knoxville	0	0	1
Memphis	0	0	1
Arkansas:			
Fort Smith	1	0	0
Little Rock	0	0	10
Louisiana:			
New Orleans	1	0	0
Shreveport	0	0	1
Oklahoma:			
Oklahoma City	0	0	2
Tulsa	0	0	2
Texas:			
Dallas	0	0	2
Fort Worth	0	0	3
Houston	0	0	1
Washington:			
Tacoma	1	1	0
California:			
Los Angeles	1	0	10

Encephalitis, epidemic or lethargic.—Cases: New York, 2; Pittsburgh, 2.
Pellagra.—Cases: Philadelphia, 1; Winston-Salem, 2; Charleston, S. C., 1; Brunswick, 1; Louisville, 1; Fort Smith, 1; New Orleans, 1; Los Angeles, 2.
Typhus fever.—Cases: New York, 1; Baltimore, 1; Wilmington, N. C., 1; Charleston, S. C., 3; Savannah, 2; Birmingham, 1; Mobile, 1; Montgomery, 1; Houston, 3.

FOREIGN AND INSULAR

JAMAICA

Communicable diseases—4 weeks ended July 10, 1937.—During the 4 weeks ended July 10, 1937, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities
Chicken pox	2	39
Diphtheria	1	2
Dysentery	3	4
Erysipelas	1	
Leprosy		2
Puerperal septicemia		1
Tuberculosis	25	93
Typhoid fever	11	80

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for July 30, 1937, pages 1054-1068. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued August 27, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

China.—Information dated July 28, 1937, stated that approximately 30 cases of cholera had been reported in Canton. The number of deaths was not known. During the week ended July 17, 1937, 100 cases of cholera were reported in Hoihow, China.

Plague

Hawaii Territory—Island of Hawaii—Hamakua District—Honokaa Sector.—One plague-infected rat was reported July 23, 1937, in Honokaa Sector, Hamakua District, Island of Hawaii, Hawaii Territory.

Indochina—Cochinchina—Sadec.—During the week ended July 10, 1937, 1 death from plague was reported in Sadec, Cochinchina, Indochina.

Peru.—During the month of July 1937, plague was reported present in Salaverry, Peru. Plague-infected rats were also reported in Peru as follows: May 12, 1 plague-infected rat in Salaverry; 1 plague-infected rat, April 6, and another May 28, in Trujillo, Peru.

Yellow fever

Colombia.—Yellow fever has been reported in Colombia as follows: Boyaca Department—Borbur, May 27–29, 2 deaths; Guadalito, May 26, 1 death; Cundinamarca Department—Yacopi, May 31, 1 death; Intendencia of Meta—Villavicencio, April 24, 1 death; Santander Department—Cuesta Rica, April 9, 1 death, Lebrija, May 7, 1 death, Rio Negro, May 18, 1 death.

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UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg Gen ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS is published primarily for distribution, in accordance with the law, to health officers, members of boards or departments of health, and other persons directly or indirectly engaged in public health work. Articles of special interest are issued as reprints or as supplements, in which form they are made available for more economical and general distribution.

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Librarians and others should preserve their copies for binding, as the Public Health Service is unable to supply the general demand for bound copies. Indexes will be supplied upon request.

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PUBLIC HEALTH REPORTS

VOL. 52 AUGUST 13, 1937 NO. 33

The Occurrence in the Sera of Man and Monkeys of Protective Antibodies Against the Virus of Lymphocytic Choriomeningitis as Determined by the Serum-Virus Protection Test in Mice*

By JERALD G. WOOLEY, *Bacteriologist*, and CHARLES ARMSTRONG, *Senior Surgeon*, and ROBERT H. ONSTOTT, *Passed Assistant Surgeon, United States Public Health Service*

Armstrong and Lillie (*1*) in 1934, described a previously unidentified virus encountered during studies of brain material from an individual who died in St. Louis, Mo., during the 1933 epidemic of encephalitis. Two additional similar strains of virus were described by Armstrong and Wooley (*2*) in 1935, one of which was isolated during studies of the brain of an individual who died in Maine and the other from a monkey that had died following inoculation with the virus of poliomyelitis.

Traub (*3*) and Lépine and Sautter (*13*) recovered a virus from white mice which resembled the virus of Armstrong, and Rivers and Scott (*4*) reported the isolation of similar strains from two human cases of meningitis. These strains were shown by Armstrong and Dickens (*8*), by Rivers and Scott (*4*), and by Traub (*3*) to be serologically identical with the Armstrong strain.

Findlay, Alcock, and Stern (*5*), in England, also isolated a virus from the cerebrospinal fluid of two human cases with nervous symptoms and a similar virus from a strain of apparently healthy laboratory mice. These strains affected animals in the same way and were immunologically similar to the virus described by Armstrong. Serum from a patient in Ireland, whose symptoms were described by Collis (*6*) was shown by Findlay et al. (*5*) to contain antibodies against both the American and the English strains of virus. Dickens (*7*), in 1932, reported two cases of aseptic meningitis, and in 1935 Armstrong and Dickens (*8*) showed that the sera from these two cases, and also the serum from a patient of Bloedorn (*9*), protected animals from the virus of lymphocytic choriomeningitis described by Armstrong and Lillie (*1*).

* From the National Institute of Health, Washington, D. C.

Thus it appears that the virus of lymphocytic choriomeningitis, first described less than 3 years ago, has been isolated in several places in the United States and in Europe, and that recovery from infection with the virus is followed by the production of demonstrable antibodies.

The studies here reported were undertaken, therefore, to determine the distribution of protective antibodies in the sera of persons from various localities of the United States.

Source and treatment of the virus.—The virus first isolated by Armstrong was employed throughout these experiments (Green strain).

The strain was maintained by serial intracerebral passages in mice, with an occasional passage through guinea pigs whenever the virus appeared to be losing potency.

The stock virus was stored in equal parts of neutral glycerin and 0.85 percent NaCl solution at about +5° C. until used.

Technique of neutralization test.—Virus for the test was prepared by finely grinding halves of three infected mouse brains in a mortar, without sand. The ground brain was then suspended in 10 cc of 0.85 percent NaCl solution of pH 7.6. After thorough mixing, the suspension was diluted to approximately 1:300, 1:2,000 and 1:10,000. To one part of each of these suspensions (0.1 cc) were added two parts of the serum (0.2 cc) to be tested. The mixtures were agitated thoroughly, then kept at a room temperature of 37° C. for 4 hours, following which 0.03 cc of each mixture was inoculated intracerebrally into each of 4 white mice by means of a 0.25-cc syringe and a 26-gage needle. Thus 12 white mice were utilized for each serum investigated.

This technique was carried out in testing all sera, except that it was occasionally necessary to make minor adjustments in the dilutions of virus to compensate for changes in pathogenicity for mice. It was found that it required a lower dilution of virus to kill mice during the cooler months than in the warmer periods of the year.

A serum known to possess strong protective properties and one without protective antibodies were included in each test.

The mice were observed for 14 days following inoculation and the date of death of those dying was recorded. Mice ill from the virus usually remained apart from the group, the hair was ruffled, and they exhibited fine tremors when lifted by the tail and often went into tetanic contractions with the rear legs completely extended. This position was usually maintained in death, which tended to occur on from the seventh to the tenth day following inoculation. Mice dying without this period or with symptoms other than those mentioned were found by pathological studies usually to have died from other causes than choriomeningitis. The histopathological studies were made by Surgeon R. D. Lillie and Passed Assistant Surgeon J. G. Pasternack.

Reading the results.—The symptoms exhibited by ill mice, the number dying, the position of the animals in death, the time of death, and the pathology of representative brain samples were considered when reading the results of the test.

If no characteristic symptoms with death occurred during the seventh to tenth days of the test while many mice with normal serum virus mixtures died, the serum was recorded as having strong protection. When only a few deaths occurred in the group inoculated with the higher concentrations of virus, the serum was recorded as possessing moderate protection. When more mice survived than with the negative control serum, though several died within the proper period, the serum was recorded as having questionable protection. When the number of deaths approximated the number dying with the negative control serum, the test serum was recorded as being devoid of antibodies. (For sample protocol see table 1.)

TABLE 1.—*Protocol of a sample test*

EXPERIMENT EX. 143, FEB 13, 1936

Serum	Cage no.	Virus dilution in serum-virus mixture	Day of death of mice	Number of mice surviving	Interpretation
Positive control	1	1:300		4	Strong protection.
	2	1.2,000		4	
	3	1:10,000		4	
Negative control	4	1.300	6, 7, 7, 8	0	No protection.
	5	1:2,000	7, 8, 9, 11	0	
	6	1 10,000	8, 11	2	
H. A. H. 2/10/36	7	1 300	9, 9, 10, 11	0	Questionable protection.
	8	1:2,000	6, 8	2	
	9	1 10,000	14	3	
W. L. B. 2/10/36	10	1 300	7, 7, 8, 9	0	No protection.
	11	1:2,000	6, 9, 9, 14	0	
	12	1 10,000		4	
B. L. L. 2/10/36	13	1.300	8	3	Strong protection.
	14	1:2,000		4	
	15	1.10,000	14	3	
J. L. E. 2/10/36	16	1 300	8, 8, 10	1	Moderate protection.
	17	1.2,000		4	
	18	1:10,000		4	

Protection tests with the sera of monkeys.—Sera were collected from 17 monkeys that had been experimentally inoculated with the virus of lymphocytic choriomeningitis 2 or more weeks previous to bleeding. One serum collected 3 weeks after inoculation was negative; the other 16 gave protection. The sera of 8 uninoculated monkeys, 11 monkeys that had received the virus of encephalitis, St. Louis type, and 16 that had been given poliomyelitis virus (monkey strain), were also tested. All were negative except two. One of these had been housed in the same room in which monkeys with lymphocytic choriomeningitis were caged. The other was housed in a distant room, but had been caught frequently in a net employed for catching the chorio-meningitis monkeys. Moreover, a spontaneously infected monkey was actually found by Armstrong and Wooley (*2*). Therefore, the

mouse-protection test appears to be a specific test for the presence in monkeys of antibodies against the virus of lymphocytic choriomeningitis. (See table 2.)

Symptoms of lymphocytic choriomeningitis in experimentally inoculated monkeys, as described by Armstrong (*1*), were frequently noted. But in our series of 16 inoculated monkeys, whose sera gave protection, 6 had had no fever nor recognizable symptoms. However, the virus was recovered from the blood of one of these monkeys on the 15th and again on the 19th day following inoculation. These observations indicate that subclinical infections in monkeys inoculated with the virus of lymphocytic choriomeningitis occur and that subsequent development of specific antibodies against the virus may take place

TABLE 2.—*Results of the protection tests employing sera of monkeys*

Source of sera	Total number of sera	Protection test results			
		Strong protection	Moderate protection	Questionable protection	No protection
Monkeys, convalescent choriomeningitis	17	13	3		1
Monkeys, convalescent St Louis type encephalitis	11	1		1	9
Monkeys, survived poliomyelitis inoculation	16	1			15
Noninoculated monkeys	8				8

Protection studies with human sera.—Blood sera from 1,248 persons from various localities of the United States were tested for protective antibodies against the virus of lymphocytic choriomeningitis, of which 138, or 11 percent, gave definite protection. The two clinical histories here given are representative for those cases showing central nervous system symptoms followed by immunity.

Case 1.—P. H., aged 29, a white male, railroad employee (patient of Dr. Paul Stookey, of Kansas City, Mo.) was seen to stumble on November 11, 1936. When approached by his foreman, he complained of headache and blurred vision. On November 12, he was admitted to a hospital in coma with a temperature of 103.6° F. Examination revealed a stiff neck, dilated pupils, and a positive Gordon on the right side. The spinal fluid was under increased pressure and contained 35 cells, mostly lymphocytes. November 13: Stiffness of neck had increased, knee jerks were absent, Babinski suggestive, Oppenheim and Gordon were positive. White blood cell count was 12,000 with 85 percent polymorphonuclear leucocytes. Spinal fluid contained 75 cells with 95 percent lymphocytes. The patient was restless, requiring restraint and artificial feeding during the first 4 days in the hospital. There was gradual improvement and the temperature was normal on November 17. Blood serum, collected December 2, gave strong protection.

Case 2.—S. M., white female, aged 30 (patient of Dr. Joseph L. Abramson, Brooklyn, N. Y.). Sudden onset on March 19, 1935, with severe occipital headache, vomiting, and a stiff neck, which followed a head cold of one week's duration. Physical examination revealed a stiff neck, horizontal nystagmus, and a temperature of 100.2° F. On March 20, spinal fluid contained 1,200 cells with 75 percent

lymphocytes; March 21, 360 cells; March 26; 60 cells; and March 30, 35 cells. The cells in each of the last three counts were all lymphocytes. The patient was discharged on March 31, apparently recovered. The blood serum collected in September 1935 gave strong protection.

Specificity of the test in man.—The origin of the sera and the results of the test, as shown in table 3, indicate the wide geographical distribution of antichoriomeningitis immune bodies in the sera of certain groups of our population. The highest incidence of protection, 32 percent, was noted among 53 sera submitted from various parts of the United States from clinically diagnosed cases of "aseptic meningitis." These findings, together with the isolation of the virus of choriomeningitis from several cases by Rivers and Scott (*4*), and by Findlay, Alcock, and Stern (*5*), indicate that this virus is the etiologic agent of a portion of the cases diagnosed as aseptic meningitis. The low incidence of protection found in the sera from other central nervous ailments, such as encephalitis in the Windber (Pa.) outbreak of 1935 (0.0 percent); encephalitis, St. Louis type, from Kentucky and Illinois, 1935 (1.4 percent); the Virginia outbreak of poliomyelitis during 1935 (3.1 percent); and mental cases from St. Elizabeths Hospital, Washington, D. C. (3.9 percent) (table 4), evidences the specificity of the test insofar as central nervous system conditions are concerned.

While recovery from choriomeningitis has been shown to lead to the development of specific antivirus substances in the serum of the individual, such antibodies were far more frequently found in certain groups tested than was a history of meningeal or central nervous system involvement. This fact might be explained either by the assumption that the test is not specific, or that the antibodies are the result of a nonidentified infection with the virus. The latter explanation appears to be the most probable, because in infected monkeys the virus is polytropic, being found (*10*), together with pathological evidence of its activity (*12*), in all the organs so far tested. It is, moreover, quite unusual for meningeal symptoms to develop in animals inoculated by routes other than directly into the central nervous system; and, as above noted, an asymptomatic type of infection, with virus circulating in the blood and with subsequent development of immunity, actually occurred in monkeys inoculated by routes other than into the central nervous system.

Table 3.—*Results of the protection tests on human sera from various sources*

Source of sera and clinical diagnosis	Total number of sera	Protection test results				
		Strong protection	Moderate protection	Questionable protection	No protection	Percentage of definite protection
Various localities (aseptic meningitis)	53	7	10	6	30	32.1
Various localities (miscellaneous diagnoses)	17	1	1	2	13	11.7
Illinois and Kentucky in 1934 (encephalitis—St. Louis type)	70	1	----------	6	63	1.4
Virginia in 1935 (poliomyelitis)	98	----------	3	25	70	3.1
Windber, Pa. epidemic in 1935 (encephalitis—type?)	25	----------	----------	3	22	0
St. Elizabeths Hospital, Washington, D. C. (mental cases)	51	1	1	9	40	3.9
U. S. Marine Hospital, Baltimore, Md. (various diagnoses)	314	31	31	36	216	19.7
Wassermann test sera:						
U. S. Northeastern Penitentiary, Lewisburg, Pa	113	10	17	10	76	23.8
U. S. Industrial Reformatory, Chillicothe, Ohio	59	5	1	----------	53	10.1
U. S. Penitentiary, Atlanta, Ga	42	1	2	7	32	7.1
Federal Industrial Institute for Women, Alderson, W. Va	39	3	1	2	33	10.2
U. S. Penitentiary Annex, Fort Leavenworth, Kans	12	3	1	1	7	----------
Alexandria Health Department, Alexandria, Va	6	2	----------	1	3	----------
U. S. National Training School for Boys, Washington, D. C	4	----------	1	----------	3	----------
Total (submitted for Wassermann test)	275	24	23	21	207	17.0
Normal children:						
Rosewood State Training School, Owens Mill, Md	81	----------	----------	6	75	0
State Colony for Epileptics and Feeble Minded, Colony, Va	47	----------	----------	5	42	0
Epworth Orphan Home, Columbia, S. C	119	----------	1	4	114	.8
Carolina Orphan Home, Columbia, S. C	22	----------	----------	1	21	0
Connie Maxwell Orphan Home, Greenwood, S C	40	----------	3	4	33	7.5
Thornwell Orphan Home, Clinton, S C	36	----------	----------	3	33	0
Total (normal children under 12 years of age)	345	----------	4	23	318	1.1
Children (under 17)	396	0	5	30	361	1.2
Adults (over 16)	481	42	46	56	337	18.3
Age unknown	371	23	22	45	281	12.1
Total	1,248	65	73	131	979	11.0

Table 4.—*Protection with sera taken during or following variously diagnosed ailments*

Clinical diagnosis	Number of sera tested	Results of serum virus protection test				
		Strong protection	Moderate protection	Questionable protection	No protection	Percentage of definite protection
Aseptic meningitis	53	7	10	6	30	32.1
Encephalitis (St. Louis type)	75	1	----------	8	66	1.3
Poliomyelitis (Virginia, 1935)	98	0	3	25	70	3.1
Windber epidemic (encephalitis, 1935)	25	0	0	3	22	0
Syphilis (positive Wassermann)	62	4	4	3	51	12.9
Gonorrheal infection	136	16	17	20	83	24.2
Lymphogranuloma inguinale	4	1	0	0	3	----------
Respiratory infections	106	14	16	10	66	28.3
Various neuropsychiatric conditions	51	1	1	9	40	3.9
Miscellaneous infections	167	13	19	23	112	19.1
Noninfectious conditions	126	10	14	13	89	19.0

The variability in severity of proved cases in man and the often observed presence of a "cold" or "grippe" a few days prior to the occurrence of meningeal symptoms suggests that these early signs may represent a systemic invasion in which the meningeal involvement is a later and possibly exceptional occurrence. The high incidence of protection found in the group giving a history of upper respiratory infection but no meningeal involvement tends to support this view (table 4). The results of the protection test with sera from various sources and conditions are shown in tables 3 and 4, respectively, and are consistent with the above-expressed concept. There is, however, an unexplained relatively infrequent occurrence of antibodies in the sera of children as compared with adults.

Protective antibodies in the sera of children.—Sera from 345 normal children, 16 years of age or under, living in orphans' homes and training schools in Maryland, Virginia, or South Carolina, and from 51 additional ill children from various localities were tested for antibodies against the virus of choriomeningitis (table 3). Not a single instance giving strong protection was encountered and moderate protection was found in only five sera or 1.2 percent of the group, while among 481 adults 17 years and over, there were 90, or 18.3 percent, that gave positive results. This relative infrequency of serological evidence of infection among the children as compared with the adults in our series is not explained, but may possibly be due to our groups not being representative samples of the general population or possibly to the virus having been prevalent in epidemic form some years ago, following which it may have tended to disappear until recently. The latter explanation would be tenable only in case the neutralizing antibodies tended to persist following the attack. Evidence on this point is meager, but Armstrong and Dickens (8) have reported the presence of potent neutralizing antibodies as long as 3 years and 11 months following the attack. The low incidence in children might, however, be explained by natural resistance to the infection, by a lack of exposure, or both.

Method of spread of the virus.—It is interesting to note that we have found it possible to transmit occasional infection by instilling the virus into the urethra or vagina of monkeys. These observations combined with the fact that we have demonstrated the presence of virus in the urine, where it tends to persist, and in the seminal vesicle fluid and testicular tissue of infected animals, together with the above-mentioned higher incidence after puberty, at least suggests a venereal route as one of the possible explanations for the peculiar age distribution.

If a portion of the cases are venereally transmitted, it seems probable that criminals and perhaps merchant seamen might represent highly exposed classes, with an incidence higher than might be expected in other adult groups. In this connection it may be noted (table 3) that sera from 51 adults from St. Elizabeths Hospital, and from 70 patients with the St. Louis type of encephalitis, many of whom were adults, gave protection in only 3.9 percent and 1.3 percent, respectively, of cases, as compared with a protection incidence of 17.0 percent and 19.7 percent, respectively, for 275 sera from Federal Penitentiary and 314 from marine hospital patients. A study of the results of the Wassermann and of the serum-virus protection tests as carried out on 275 sera, however, shows no increased incidence of protection among those with positive Wassermann findings as compared with those showing a negative test. In fact the reverse is the case, since positive Wassermann readings were present in 62 of the 275 cases, or 22.5 percent,[1] of which number 8, or 12.9 percent, had definitely demonstrable protective antibodies against the virus of choriomeningitis, while among 213 negative Wassermann sera there were 39, or 18.3 percent, that gave definite protection. This series is small, however, and it is known that many of the negative sera had been rendered so by vigorous antisyphilitic treatment.

The evidence set forth as suggesting a venereal route of infection is not considered to be in any sense conclusive, but is mentioned merely as one possible route of infection to be kept in mind by those who may investigate cases of the disease.

Protection test results according to nationality, color, and occupation.—Information as to nativity, color, and occupation of the serum donors was available only for inmates of the Baltimore Marine Hospital and the Northeastern Penitentiary, Lewisburg, Pa. By reference to table 5 it may be noted that these factors apparently exerted very little influence upon the incidence of protective antibodies in sera from these two groups of patients. Too few sera from females were tested to permit of a comparison of the occurrence of antibodies in the two sexes.

[1] The Wassermann tests were performed by Miss Rose Parrott, serologist, at the National Institute of Health.

TABLE 5.—*Protection tests on sera of patients from the U. S. Marine Hospital, Baltimore, Md., and from Northeastern Penitentiary, Lewisburg, Pa., by various groups*

Classification of patients	Number of sera tested	Results of protection test				Percentage of definite protection
		Strong	Moderate	Questionable	Negative	
Foreign born	87	9	8	14	56	19.3
Native born	313	28	34	29	222	19.8
Unknown	2				2	
White	385	34	47	43	261	21.0
Colored	42	7	1	3	31	19.0
Merchant seamen	177	17	19	21	120	20.3
Office workers	26	2	3	1	20	19.2
Miscellaneous	199	18	20	22	136	19.1
Age (in years):						
17–20	22	2	1	2	17	13.6
21–30	120	11	12	12	85	19.1
31–40	143	8	17	16	102	17.4
41–50	74	9	8	4	53	22.9
51 plus	43	7	4	9	23	25.5

SUMMARY

1. The technique of the serum-choriomeningitis virus protection test in mice is described.

2. The protection test appears to be a practicable test for the presence of specific neutralizing antibodies in the sera of monkeys and man.

3. Antibodies were demonstrated by the protection test in 138 (11 percent) of 1,248 sera tested, questionable protection was noted in 131 (10.4 percent), while 979 (78.6 percent) gave negative results. Sera from Federal penal institutions and from beneficiaries of the United States marine hospitals gave a higher incidence of protection than did those of comparable age from other groups and probably are not representative of our general population.

4. Antibodies were demonstrated by the protection test in 90 sera from 481 adults (over 17 years), or 18.3 percent, while only 5 sera from 396 persons under 17 years of age, or 1.2 percent, showed protection. The reason for the difference in age incidence is not established.

5. Antibodies were demonstrated by the protection test in 17 of 53 sera (32.1 percent) from individuals on whom a clinical diagnosis of "aseptic meningitis" was made.

6. A positive protection test is believed to indicate that the serum donor has been in contact with virus of choriomeningitis.

7. The occurrence of demonstrable antibodies in 117 sera from 997 individuals without history of central nervous system or meningeal involvement suggests that immunity may result not only from a frank meningeal attack but also from either a subclinical infection or

a clinical condition, possibly an upper respiratory symptom complex, not yet recognized as due to choriomeningitis virus.

ACKNOWLEDGMENTS

The authors gratefully acknowledge the assistance afforded them by officials of the various institutions from which serums and clinical histories were supplied.

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NOTE ON COMPARATIVE TESTS MADE WITH THE HATCH AND THE GREENBURG-SMITH IMPINGERS[1]

By J. M. DallaValle, *Passed Assistant Sanitary Engineer, United States Public Health Service*

Since the introduction of the Greenburg-Smith impinger in 1923 several modifications of this important dust-sampling device have been made (*1*) (*2*). In general, it may be said that these modifications have not affected the basic impingement principle. Such changes as have been made have been concerned chiefly with alterations in the design of the flask used. However, in 1932, Hatch, Warren, and Drinker described a modification of the impinger apparatus which has since been widely used (*3*). In the impinger developed by these

[1] From the Laboratory of Industrial Hygiene, National Institute of Health.

investigators, the fixed disk was discarded and a distinct improvement in design was made by combining the suction connection and the inlet tube into a single piece. The impingement principle was retained by setting the nozzle approximately 5 mm from the bottom of a 325-cc flat-bottom flask. This flask was 50 mm in diameter, with volumetric graduations in steps of 50 cc starting at the 75-cc line, which represented the amount of impingement fluid used. A line 50 mm from the bottom of the flask indicated the nozzle setting.

Although Hatch and his coworkers showed that the characteristics of the modified impinger compared favorably with the Greenburg-Smith designs discussed in Public Health Bulletin 144, a comparative test of the two instruments under field conditions was never made. This omission, coupled with the modifications incorporated in the Hatch impinger, has resulted in numerous requests to the Public Health Service for information regarding the similarity of the two instruments for dust quantification.

In order to make comparative tests of these two instruments, dust samples were taken in a steel foundry and in a ceramic mill with both impingers strapped together and operated simultaneously at a sampling rate of one cubic foot per minute. The nozzle of the Hatch impinger was kept adjusted at the 5-mm mark, although it has been shown that the impingement distance might be varied from 2 to 7 mm without affecting the efficiency of the device. The impingement distances of both instruments were therefore the same.

Comparison of the Hatch and Greenburg-Smith impingers

CORE-MAKERS' EXPOSURE—FOUNDRY

Sample no.	Sample diluted to—	Dust concentration—millions of particles per cubic foot		Difference (b−a)	Percent difference in terms of Greenburg-Smith impinger
		G.-S. (a)	Hatch (b)		
	cc				
1	250	6.5	5.9	−0.6	−9.2
2	250	7.4	7.1	−0.3	−4.1
3	250	4.7	5.5	+0.8	+17.0
4	250	4.8	5.0	+0.2	+4.2
5	250	7.4	7.0	−0.4	−5.4
6	500	2.3	2.2	−0.1	−4.3
KNOCKOUT-MEN'S EXPOSURE—FOUNDRY					
7	5,000	81.2	87.2	+6.0	+7.4
8	5,000	308.0	288.0	−20.0	−6.5
9	5,000	324.0	316.0	−8.0	−2.5
10	10,000	872.0	860.0	−12.0	−1.4
11	10,000	832.0	868.0	+36.0	+4.3
12	5,000	336.0	328.0	−8.0	−2.4
SCREENERS' EXPOSURE—CERAMIC DUST					
13	20,000	456.0	500.0	+44.0	+9.7
14	20,000	824.0	784.0	−40.0	−4.9
15	5,000	202.0	207.0	+5.0	+2.2
16	5,000	204.0	186.0	−18.0	−8.8
17	2,500	205.0	204.0	−1.0	−0.49
18	2,500	57.0	59.7	+2.7	+4.7

One hundred cubic centimeters of impinging fluid were used in the Greenburg-Smith impinger and 75 cc in the Hatch impinger. The samples were counted by the light field technique described by Greenburg and Bloomfield (*2*).

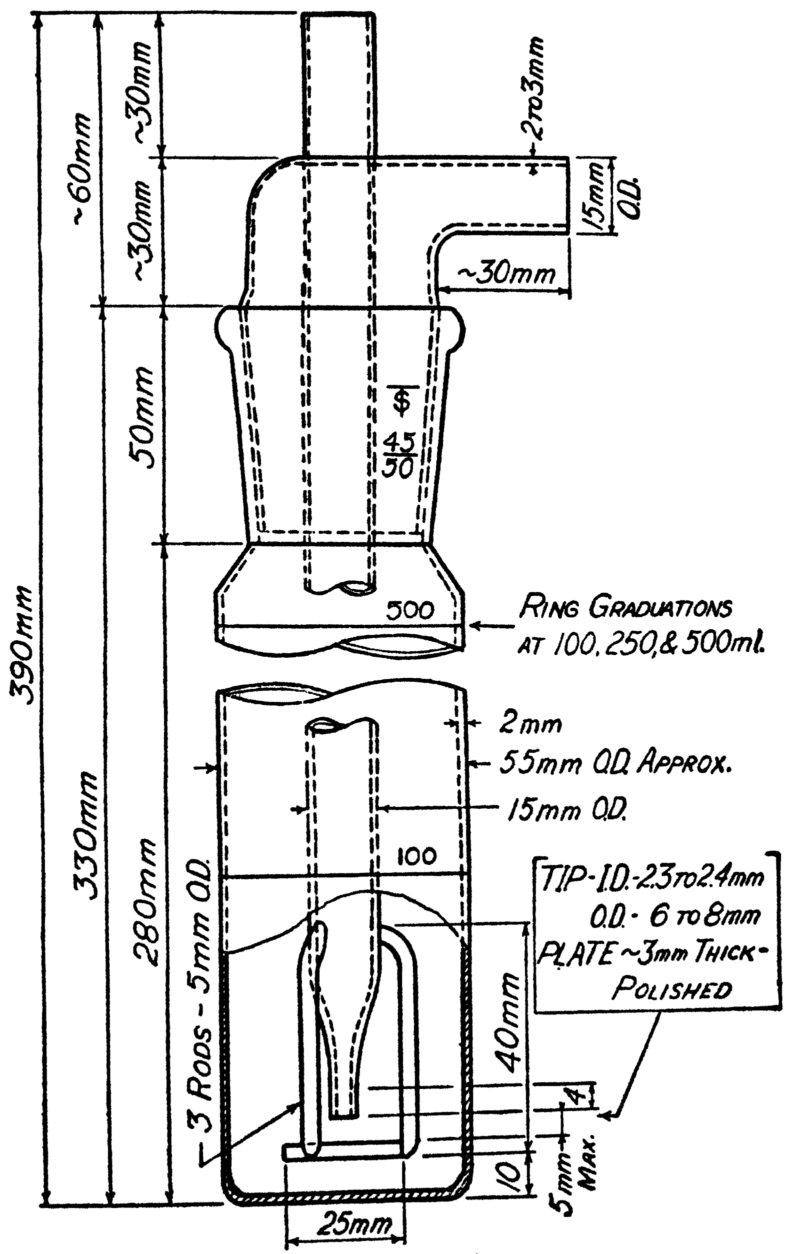
The results of the tests made are shown in the accompanying table. In all, 18 samples were taken, with dust concentrations ranging from approximately 2 million to more than 800 million particles per cubic foot of air. The corresponding determinations give very similar results. The differences, except for one pair of samples, lie within ± 10 percent of the counts obtained by the Greenburg-Smith impinger, a range within that of the experimental and personal errors. Hence, it may be concluded that the Hatch impinger gives the same results as would be obtained with the Greenburg-Smith type.

The Public Health Service has used both the Hatch and Greenburg-Smith types of impingers in its field studies. However, it has generally favored the latter type inasmuch as it has been believed that a fixed impingement disk tends to eliminate possible sampling errors which might occur through fluctuations in the impingement distance. Such variations have been thought to be significant in the Hatch-type impinger, especially since some flasks and nozzles have been found to be noninterchangeable without a certain amount of readjustment to stoppers. Readjustment of some stoppers frequently entails many difficulties, because of their tendency to adhere to the glass surfaces.

Recently it has been possible to construct an all-glass (Pyrex) impinger which embodies what is believed to be the best features of both types of impingers described above.[2] This new type of impinger is shown in the accompanying illustration. It consists of a flat-bottom cylindrical flask, with three graduations, 100 cc, 250 cc, and 500 cc. These graduations permit dilutions of samples to be made easily in the flask itself without the necessity of transferring to larger containers as is usually the case. The tops of all flasks are ground uniformly for $\overline{\$}$45/50 glass stoppers. The nozzles are equipped with fixed disks, but with much shorter supporting arms. This tends to cut down breakage, which formerly was a serious drawback to the all-glass Greenburg-Smith type of nozzle. The combination suction connection and inlet tube used on the Hatch impinger is retained, but the former now has been carefully ground so as to be interchangeable with all flasks.

The impinger just described is a rigid unit. There is little opportunity for the fixed disk or supporting rods to break. The all-glass feature also makes it possible to use, for sampling certain gases, liquids which ordinarily attack rubber. In addition, the fact that the complete nozzle can be immersed in caustic solutions for cleaning is a feature which has long been desired.

[2] The writer is indebted to Mr. W. J. D. Walker, of the Corning Glass Works, Corning, N. Y., for many suggestions incorporated in this design.



New type all-glass impinger.

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SIMPLE EQUIPMENT FOR REMOVING CHANNEL OBSTRUCTIONS

By R. E. Dorer, *Assistant State Director of Malaria Control, Virginia*

The success of any malaria-control drainage enterprise depends upon adequate drainage outlet. Often it is impossible to drain pools and ponds which breed countless mosquito larvae, because the clogging of a natural channel does not allow sufficient run-off or wastes valuable grade. The filling of a stream bed with logs and debris may cause the stream to overflow its banks and leave pockets of water to produce successive crops of mosquitoes. It can readily be seen that in such cases it is as essential to clean the main channel as it is to install lateral ditching.

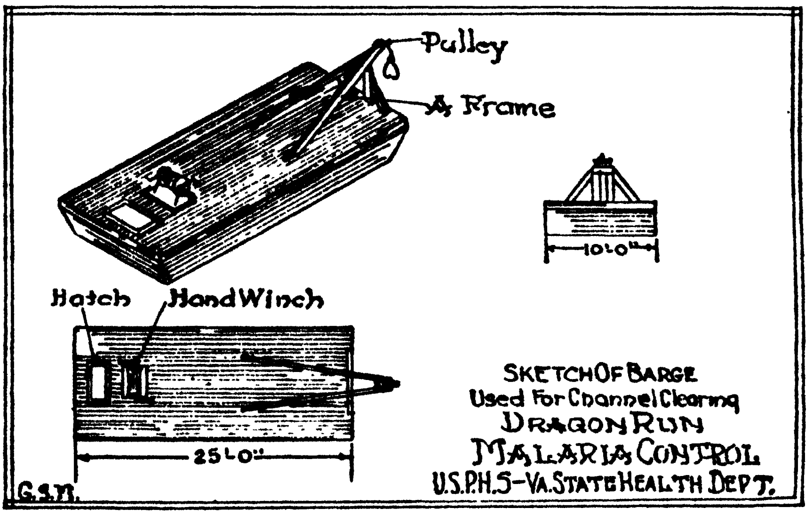
The development of stream blockage is simple. A tree blows over, a log from some sawmill operation "catches up" in a bend, a coon hunter fells a tree to get across the stream, or some other similar incident initiates the process. In times of flood, branches, leaves, and debris become lodged behind the main obstruction, creating the nucleus of a dam. Erosion of surrounding hillsides causes sand and soil to be washed into the stream and, in turn, deposited behind the dam, thus completing the obstruction. The result may be a change in stream location or the formation of an island, but in all cases a loss of grade. Many times trees take root in this newly made land; the change is then made permanent in nature.

The problem of removing obstructions and returning a stream to its original condition involves more or less heavy operations. A land pull from either bank is not practicable when used alone. Dynamite can not always be used, because of the destruction of fish life. Timbers submerged for years become water-logged and embedded in the bottom of streams and are very difficult to remove. To meet this particular need in malaria control drainage in Virginia, a barge has been constructed, together with a small bateau or flat-bottomed skiff. The barge is 10 feet by 25 feet by 32 inches. On the forward deck and extending over the end, an A frame was built, equipped with a sheave. A hand winch was mounted near the stern. A cable from the winch, carrying timber hooks on the free end, extends over the

Tree trunk brought to surface and ready to be hauled to shore

sheave in the A frame. Logs and other debris to be removed are grappled and, by means of the hand winch, are broken loose from the bed of the stream. In the case of resistant loads, effective additional lifting power can be secured by having several men move to the stern of the barge. Heavy obstructions are usually lifted endwise from the channel above water level and are then conveyed to the bank by a second winch mounted on a slide and anchored at some advantageous point on the shore. By this method logs are hauled to the shore and up on the bank. Entire trees, 5 feet in diameter at the stump, have been thus removed. As much as 8 tons have been lifted in a single operation.

Lines from the shore, attached to cleats on the four corners of the barge, hold the barge in any desired position. The barge will float in 4 to 5 inches of water, and can be moved over land by skidding,



with the hand winch used for power. The bateau is used for probing and for other general purposes. The barge and bateau, fully equipped, including labor, cost only $210.

To March 1, 1937, the barge had been in use for 1,012 hours (including time taken for moving and break-downs), during which time it has removed from the stream 1,057 logs, 335 stumps, and 521 trees. It is not uncommon to move major obstructions at the rate of 4 or 5 per hour.

The location of the project for which this barge was designed is inaccessible to land machinery. Block and falls or other simple machines working from the bank would be of little value, because it is necessary to lift an obstruction before it can be pulled to and upon the shore. This simple barge rig has solved this problem. It has

done the work of heavy expensive machinery without difficulty. It is accomplishing the most important operation of the work of the drainage project—providing an adequate outlet—for a drainage system is no better than its outlet.

PUBLIC HEALTH SERVICE PUBLICATIONS

A List of Publications Issued During the Period January–June 1937

There is printed herewith a list of publications of the United States Public Health Service issued during the period January–June 1937.

The most important articles that appear each week in the Public Health Reports are reprinted in pamphlet form, making possible a wider and more economical distribution of information that is of especial value and interest to public health workers and the general public.

All of the publications listed below except those marked with an asterisk (*) are available for free distribution and as long as the supply lasts may be obtained by addressing the Surgeon General, United States Public Health Service, Washington, D. C. Those publications marked with an asterisk are not available for free distribution, but, unless stated to be "out of print", may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., *at the prices noted.* (No remittances should be sent to the Public Health Service.)

Periodicals

*Public Health Reports (weekly), January–June, vol. 52, nos. 1–26, pages 1 to 871. 5 cents a copy.

*Venereal Disease Information (monthly), January–June, vol. 18, nos. 1–6, pages 1 to 222. 5 cents a copy.

Reprints from the Public Health Reports

1791. Report on market-milk supplies of urban communities. Compliance of the market-milk supplies of urban communities with the grade A pasteurized and grade A raw milk requirements of the Public Health Service Milk Ordinance and Code (as shown by ratings of 90 percent or more reported by the State milk-sanitation authorities during the period Jan. 1, 1935, to Dec. 31, 1936). January 29, 1937. 4 pages.

1792. Disabling illness among industrial employees in 1935 as compared with earlier years. By Dean K. Brundage. January 1, 1937. 8 pages.

1793. Toxicity of fruit sprays. A study of lead spray residues in Iowa-grown fruit, with reference to manifestations in consumers. By Ralph H. Heeren and Helen B. Funk. January 1, 1937. 9 pages.

1794. Six years' intensive observation on the seasonal prevalence of a tick population in western Montana. A preliminary summary. By Cornelius B. Philip. January 1, 1937 6 pages.

1795. Further study of the duration and cost of Federal compensation cases with disease as a complicating factor. Cases classified into accidental injuries, occupational diseases, and hernias. By William M. Gafafer. January 8, 1937. 16 pages.

1796. Studies in chemotherapy. II. Chemotherapy of experimental pneumococcus infections. By Sanford M. Rosenthal. January 8, 1937. 6 pages.
1797. Distribution of tuberculosis mortality in the white population of the United States. By C. C. Dauer. January 15, 1937. 6 pages.
1798. Rat harborage and ratproofing. By B. E. Holsendorf. January 15, 1937. 7 pages.
1799. Sources of infection and seasonal incidence of tularaemia in man. By Edward Francis. January 22, 1937. 10 pages.
1800. Salient public health features of rheumatic heart disease. By O. F. Hedley. February 5, 1937. 8 pages.
1801. Control of chromic acid mists from plating tanks. By Edward C. Riley and F. H. Goldman. February 5, 1937. 3 pages.
1802. Studies in chemotherapy. III. The effect of p-aminobenzene sulphonamide on pneumococci in vitro. By Sanford M. Rosenthal. February 12, 1937. 5 pages.
1803. Pulmonary tumors in mice. I. The susceptibility of the lungs of albino mice to the carcinogenic action of 1, 2, 5, 6-dibenzanthracene. By H. B. Andervont. February 19, 1937. 9 pages.
1804. The determination of mercury in carroted fur. By F. H. Goldman. February 19, 1937. 3 pages.
1805. Lactoflavin in the treatment of canine blacktongue. By W. H. Sebrell, D. J. Hunt, and R. H. Onstott. February 26, 1937. 5 pages.
1806. Age of gainful workers of the United States, 1920 and 1930. Studies on the age of gainful workers no. 1. By William M. Gafafer. March 5, 1937. 13 pages.
1807. The distribution of *Brucella melitensis* variety *melitensis* in the United States. By Alice C. Evans. March 12, 1937. 9 pages.
1808. Pulmonary tumors in mice. II. The influence of heredity upon lung tumors induced by the subcutaneous injection of a lard-dibenzanthracene solution. By H. B. Andervont March 12, 1937. 12 pages.
1809. Some aspects of blanket coverage of occupational diseases in the United States. March 19, 1937. 6 pages.
1810. Pulmonary tumors in mice. III. The serial transmission of induced lung tumors. By H. B. Andervont. March 26, 1937. 9 pages.
1811. Public Health Service publications. A list of publications issued during the period July–December 1936. March 26, 1937. 4 pages.
1812. Studies of sewage purification. VI. Biochemical oxidation by sludges developed by pure cultures of bacteria isolated from activated sludge. By C. T. Butterfield, C. C. Ruchhoft, and P. D. McNamee. April 2, 1937. 26 pages.
1813. The treatment of blacktongue with a preparation containing the "filtrate factor", and evidence of riboflavin deficiency in dogs. By W. H. Sebrell, R. H. Onstott, and D. J. Hunt. April 9, 1937. 7 pages.
1814. Labile bacterial antigens and methods of preparing and preserving them. By Stuart Mudd, E. J. Czarnetzky, Horace Pettit, and David Lackman. April 9, 1937. 3 pages.
1815. Age of gainful male workers in different geographic regions of the United States, 1920 and 1930. Studies on the age of gainful workers no. 2. By William M. Gafafer. April 9, 1937. 17 pages.
1816. Studies on trichinosis. I. The incidence of trichinosis as indicated by postmortem examinations of 300 diaphragms. By Maurice C. Hall and Benjamin J. Collins. April 16, 1937. 22 pages.

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1817. Studies on trichinosis. II. Some correlations and implications in connection with the incidence of trichinae found in 300 diaphragms. By Maurice C. Hall and Benjamin J. Collins. April 23, 1937. 16 pages.

1818. Sickness among male industrial employees during the final quarter of 1936 and the year as a whole. By Dean K. Brundage. April 30, 1937. 3 pages.

1819. Studies on trichinosis. III. The complex clinical picture of trichinosis, and the diagnosis of the disease. By Maurice C. Hall. April 30, 1937. 12 pages.

1820. Radio pratique. Pratique by wireless in lieu of quarantine inspection for passenger vessels. By C. V. Akin. April 23, 1937. 5 pages.

1821. Mortality in certain States during 1936, with comparative data for recent years. May 7, 1937. 11 pages.

1822. Tuberculosis control by a small county health department. Brunswick-Greensville health administration studies no. 8. By J. O. Dean. May 7, 1937. 12 pages.

1823. Seasonal patterns and trends of communicable diseases. By Robert Olesen and Brock C. Hampton. May 7, 1937. 8 pages.

1824. Dibenzanthracene tumors in mice. The production of subcutaneous, pulmonary, and liver tumors by serum dispersions and lard solutions. By H. B. Andervont and Egon Lorenz. May 14, 1937. 11 pages; 2 plates.

1825. Studies in chemotherapy. IV. Comparative studies of sulphonamide compounds in experimental pneumococcus, streptococcus, and meningococcus infections. By Sanford M. Rosenthal, Hugo Bauer, and Sara E. Branham. May 21, 1937. 10 pages.

1826. Studies in chemotherapy. V. Sulphanilamide, serum, and combined drug and serum therapy in experimental meningococcus and pneumococcus infections in mice. By Sara E. Branham and Sanford M. Rosenthal. May 28, 1937. 11 pages.

1827. Some experiments with rats and rat guards. By O. E. Denney June 4, 1937. 4 pages; 8 plates.

1828. A new species of Thrassis (*Siphonaptera*). By William L. Jellison. June 4, 1937. 3 pages.

1829. Age of gainful female workers in different geographic regions of the United States, 1920 and 1930. Studies on the age of gainful workers no. 3. By William M. Gafafer. June 4, 1937. 19 pages.

1830. Report on two outbreaks of food poisoning. By J. C. Geiger. June 11, 1937. 8 pages.

1831. Incidence of spontaneous tumors in a colony of strain C_3H mice. By H. B. Andervont and W. J. McEleney. June 11, 1937. 9 pages.

1832. Geographical distributions of mortality from tuberculosis, cancer, appendicitis, and typhoid fever in the white population of the United States. By L. L. Lumsden and C. C. Dauer. June 18, 1937. 8 pages.

1833. The need for industrial hygiene courses in public health curricula. By J. J. Bloomfield and R. R. Sayers. June 18, 1937. 4 pages.

1834. Purification and precipitation of the erythrogenic factor of scarlet fever streptococcus toxin and its antigenic value. By M. V. Veldee. June 25, 1937. 11 pages.

1835. Typhoid vaccine: The technique of its preparation at the Army Medical School. By Rufus L. Holt and Arthur P. Hitchens. June 25, 1937. 16 pages; 4 plates.

Supplements to the Public Health Reports

122. Clinical studies of drug addiction. I. The absence of addiction liability in "perparin." By C. K. Himmelsbach. 1937. 4 pages.

123. The scientific exhibit "The Story of Life", at the Texas Centennial Exposition, Dallas, Tex., June 6–November 29, 1936. By Paul T. Erickson. 1937. 28 pages; 10 plates.
124. Ground-water supplies. Progress report of the Committee on Ground-water Supplies, Conference of State Sanitary Engineers, 1936. 1937. 24 pages.
125. Clinical studies of drug addiction. II. "Rossium" treatment of drug addiction. By C. K. Himmelsbach. With a report on the chemistry of "rossium." By Lyndon F. Small. 1937. 18 pages.
126. The public health program under title VI of the Social Security Act. 1937. 23 pages.

Public Health Bulletins

233. Measurements of ultraviolet radiation and illumination in American cities during the years 1931 to 1933. By James E. Ives and W. A. Gill. March 1937. 36 pages.
234. A study of chronic mercurialism in the hatters' fur-cutting industry. Medical studies by Paul A. Neal and Roy R. Jones. Engineering studies by J. J. Bloomfield and J. M. DallaValle. Statistical analysis by Thomas I. Edwards. May 1937. 70 pages; 21 plates.
235. Mortality among Southern Negroes since 1920. With comparative data for Southern whites and Northern Negroes. By Mary Gover. June 1937. 52 pages.
236. Evaluation of the industrial hygiene problems of a State. By J. J. Bloomfield and Mary F. Peyton June 1937. 126 pages.

National Institute of Health Bulletins

167. The pathology of tularaemia. I. The pathology of tularaemia in man. By R. D. Lillie ana E. Francis. II. The pathology of tularaemia in the Belgian Hare (*Oryctolagus cuniculus*). By R. D. Lillie and E. Francis. III. The pathology of tularaemia in the black-tailed jack rabbit (*Lepus* sp.). By R. D. Lillie and E. Francis. IV. The pathology of tularaemia in the cottontail rabbit (*Sylvilagus floridanus*). By R. D. Lillie and E. Francis. V. The pathology of tularaemia in the cotton rat (*Sigmodon hispidus*). By R. D. Lillie and E. Francis. VI. The pathology of tularaemia in the California ground squirrel (*Citellus beecheyi beecheyi*). By R. D. Lillie and E. Francis. VII. The pathology of tularaemia in the mouse (*Mus musculus* and *M. musculus albinus*). By R. D. Lillie and E. Francis. VIII. The pathology of tularaemia in the white rat (*Rattus norvegicus albinus*). By R. D. Lillie and E. Francis. IX. The pathology of tularaemia in the guinea pig (*Cavia cobaya*). By R. D. Lillie and E. Francis. X. The pathology of tularaemia in the sheep (*Ovis aries*). By R. D. Lillie, E. Francis, and R. R. Parker. XI. The pathology of tularaemia in the opossum (*Didelphis virginiana*). By R. D. Lillie and E. Francis. XII. The pathology of tularaemia in other mammals. By R. D. Lillie and E. Francis. XIII. The pathology of tularaemia in the quail (*Colinus virginianus*). By R. D. Lillie and E. Francis. XIV. The pathology of tularaemia in other birds. By R. D. Lillie, E. Francis, and R. R. Parker. February 1937. 217 pages; 88 plates.
169. Standardization of antipneumococcus horse sera and concentrates. By Lloyd D. Felton and H. J. Stahl. February 1937. 58 pages.

Annual Report

Annual Report of the Surgeon General of the United States Public Health Service for the fiscal year 1936. 158 pages.

Unnumbered Publications

Index to Public Health Reports, vol. 51, part 2 (July–December 1936). 1937. 24 pages.

Treatment of malaria. Reprinted from Public Health Reports. May 28, 1937. 1 page.

*National Negro Health Week program. This pamphlet is published annually, usually about the middle of March, for community leaders in an effort to suggest ways and means by which interested individuals and organizations may be organized for a concerted and effective attack upon the community's disease problems. Twenty-third annual observance. 1937. 8 page folder. Out of print.

*National Negro Health Week poster. Twenty-third annual observance. 1937. Out of print.

*National Negro Health Week leaflet. Twenty-third annual observance. 1937. 2 pages. Out of print.

Reprints from Venereal Disease Information

61. The efficiency of State and local laboratories in the performance of serodiagnostic tests for syphilis. By Thomas Parran, H. H. Hazen, Arthur H. Sanford, F. E. Senear, Walter M. Simpson, and R. A. Vonderlehr. Vol. 18, no. 1. 8 pages.
62. Asymptomatic neurosyphilis. Cooperative clinical studies in the treatment of syphilis. By Paul A. O'Leary, Harold N. Cole, Joseph Earle Moore, John H. Stokes, Udo J. Wile, Thomas Parran, R. A. Vonderlehr, and Lida J. Usilton. Vol. 18, no. 3. 21 pages.
63. Continuous and intermittent treatment for early syphilis. By John H. Stokes and Lida J. Usilton. Vol. 18, no. 3. 18 pages.
64. Late prenatal syphilis with special reference to interstitial keratitis, its prevention and treatment. By Harold N. Cole, Lida J. Usilton, Joseph Earle Moore, Paul A. O'Leary, John H. Stokes, Udo J. Wile, Thomas Parran, and R. A. Vonderlehr. Vol. 18, no. 4. 15 pages.
65. The philosophy of case holding. By Louise B. Ingraham and John H. Stokes. Vol. 18, no. 5. 5 pages.

DEATHS DURING WEEK ENDED JULY 24, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 24, 1937	Corresponding week, 1936
Data from 86 large cities of the United States.		
Total deaths	7,384	7,841
Average for 3 prior years	8,984	
Total deaths, first 29 weeks of year	205,473	206,876
Deaths under 1 year of age	588	557
Average for 3 prior years	501	
Deaths under 1 year of age, first 29 weeks of year	16,751	16,646
Data from industrial insurance companies:		
Policies in force	70,056,862	68,651,544
Number of death claims	11,684	13,710
Death claims per 1,000 policies in force, annual rate	8.7	10.4
Death claims per 1,000 policies, first 29 weeks of year, annual rate	10.4	10.4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 31, 1937, and Aug. 1, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 31, 1937	Week ended Aug. 1, 1936	Week ended July 31, 1937	Week ended Aug. 1, 1936	Week ended July 31, 1937	Week ended Aug. 1, 1936	Week ended July 31, 1937	Week ended Aug. 1, 1936
New England States:								
Maine		1			5	40	0	0
New Hampshire					4	12	0	0
Vermont	1				5	7	0	0
Massachusetts	6	9			66	118	0	3
Rhode Island					6	7	1	0
Connecticut	3	1	1		10	14	0	0
Middle Atlantic States:								
New York	20	29	[1] 4	[1] 1	314	261	4	10
New Jersey	4	3	2	2	125	74	3	3
Pennsylvania	9	10			249	89	4	3
East North Central States:								
Ohio	22	25	10	11	534	121	5	9
Indiana	9	11		5	31	2	3	1
Illinois [2]	20	22	5	7	169	12	4	5
Michigan	10	12			128	22	1	1
Wisconsin		1	9	1	21	32	0	0
West North Central States:								
Minnesota	3	3		2		20	1	2
Iowa	4		1		8	4	3	1
Missouri	6	6	44	18	14	5	0	1
North Dakota		4		2	1	3	0	0
South Dakota	1	1			1		0	0
Nebraska		5			5	2	0	1
Kansas	3	4	2		9	3	1	0
South Atlantic States:								
Delaware					1		0	0
Maryland [2] [3]	9	4			6	33	3	1
District of Columbia	1	5			6	20	0	1
Virginia [2]	5				55	16	2	6
West Virginia	3	3	9	4	30	4	5	0
North Carolina [2] [4]	12	9			62	2	0	2
South Carolina [4]	5	3	40	29	6	6	0	1
Georgia [4]	5	11					0	3
Florida [4]	6	7		1		2	2	1
East South Central States:								
Kentucky	8	3	1	1	51	2	3	1
Tennessee [3]	4	6	3	2	21	10	1	2
Alabama [4]	12	9	12	1	8	3	11	1
Mississippi [2]	9	5					0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 31, 1937, and Aug. 1, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended July 31, 1937	Week ended Aug. 1, 1936	Week ended July 31, 1937	Week ended Aug. 1, 1936	Week ended July 31, 1937	Week ended Aug. 1, 1936	Week ended July 31, 1937	Week ended Aug. 1, 1936
West South Central States:								
Arkansas	11	1	7	4	2		0	0
Louisiana	7	11	16	13		4	0	0
Oklahoma [5]	4	6	5	5	3	3	2	0
Texas [4]	22	16	55	24	66	18	2	1
Mountain States:								
Montana		1			10	1	0	0
Idaho [2]	1		6	1	4	7	0	0
Wyoming [2]					1	3	0	0
Colorado [2]	6	4			32	5	2	1
New Mexico	3	3	1	1	22	6	0	0
Arizona		2	15	5	1	21	0	0
Utah [3]					22	12	0	0
Pacific States								
Washington	1	1			16	22	2	0
Oregon [2]			8	2	4	5	0	0
California [4]	22	12	10	11	36	91	5	5
Total	286	269	266	153	2,170	1,144	70	66
First 30 weeks of year	12,811	13,842	273,800	139,497	238,001	265,377	3,991	5,702

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 31, 1937	Week ended Aug. 1, 1936	Week ended July 31, 1937	Week ended Aug. 1, 1936	Week ended July 31, 1937	Week ended Aug. 1, 1936	Week ended July 31, 1937	Week ended Aug. 1, 1936
New England States:								
Maine	3	2	1	17	0	0	5	3
New Hampshire	2	1	4		0	0	0	0
Vermont	0	1	1	2	0	0	0	1
Massachusetts	13	[illegible]	32	55	0	0	5	4
Rhode Island	0	0	2	2	0	0	0	0
Connecticut	2	0	10	9	0	0	4	0
Middle Atlantic States:								
New York	11	6	93	101	0	0	12	19
New Jersey	5	0	15	26	0	0	2	9
Pennsylvania	6	1	62	72	0	0	28	25
East North Central States:								
Ohio	48	1	117	75	3	1	25	13
Indiana	15	0	21	19	6	0	8	6
Illinois [2]	26	12	91	117	4	12	18	19
Michigan	10	3	138	79	1	0	11	11
Wisconsin	2	0	54	78	3	11	1	3
West North Central States:								
Minnesota	1	4	19	28	12	2	0	0
Iowa	3	0	25	29	20	0	8	1
Missouri	16	2	34	23	0	1	30	20
North Dakota	0	3	6	2	1	9	1	0
South Dakota	0	1	3	4	0	4	4	1
Nebraska	11	3	10	16	0	2	1	0
Kansas	7	0	17	36	1	0	7	8
South Atlantic States:								
Delaware	0	0			0	0	0	0
Maryland [2 3]	7	0	10	15	0	0	18	11
District of Columbia	1	0	6	1	0	0	6	1
Virginia [2]	5	3	11	4	0	0	37	10
West Virginia	4	0	15	12	3	1	12	10
North Carolina [2 4]	6	2	19	7	0	0	21	23
South Carolina [4]	1	0	2	2	0	0	15	13
Georgia [4]	2	0	10	8	0	0	35	46
Florida [4]	1	0	1	3	0	0	1	2
East South Central States:								
Kentucky	33	3	6	5	0	0	45	32
Tennessee [2]	6	26	16	13	0	0	38	32
Alabama [4]	1	29	6	4	0	0	5	15
Mississippi [3]	13	5	5	2	2	0	25	10

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended July 31, 1937, and Aug. 1, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended July 31, 1937	Week ended Aug. 1, 1936	Week ended July 31, 1937	Week ended Aug. 1, 1936	Week ended July 31, 1937	Week ended Aug. 1, 1936	Week ended July 31, 1937	Week ended Aug. 1, 1936
West South Central States:								
Arkansas	26	0	4	4	0	0	38	18
Louisiana	5	0	5	2	0	0	32	27
Oklahoma [5]	28	0	13	5	0	0	32	14
Texas [4]	42	1	21	21	0	0	72	34
Mountain States:								
Montana	0	1	15	4	25	20	1	3
Idaho [3]	0	1	8	1	2	1	1	1
Wyoming [3]	1	0	------	9	0	2	0	1
Colorado [3]	2	6	6	7	0	1	5	4
New Mexico	0	0	3	8	0	0	5	7
Arizona	1	0	4	5	0	0	3	5
Utah [3]	0	0	5	8	0	0	0	2
Pacific States:								
Washington	0	1	14	8	4	0	5	1
Oregon [3]	1	1	4	6	6	1	2	4
California [4]	34	16	56	84	9	3	16	16
Total	401	142	1,020	1,038	102	71	640	494
First 30 weeks of year	2,071	1,036	162,236	175,916	7,795	5,838	6,126	5,512

[1] New York City only.
[2] Rocky Mountain spotted fever, week ended July 31, 1937, 12 cases, as follows Illinois, 2, Maryland, 1; Virginia, 2, North Carolina, 2, Tennessee, 1; Idaho, 1, Wyoming, 1; Colorado, 1; Oregon, 1.
[3] Week ended earlier than Saturday
[4] Typhus fever, week ended July 31, 1937, 60 cases, as follows. North Carolina, 5, South Carolina, 3; Georgia, 29, Florida, 2; Alabama, 8, Texas, 12, California, 1
[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June 1937										
Alabama	29	35	49	515	120	54	10	18	1	33
North Dakota	------	6	230	------	3	------	0	85	51	2
Oregon	1	4	29	4	18	------	2	91	39	5
Tennessee	10	16	67	75	416	39	18	32	0	44

June 1937

	Cases
Chicken pox:	
Alabama	32
North Dakota	75
Oregon	77
Tennessee	39
Dysentery:	
Alabama (amoebic)	2
Tennessee (amoebic)	2
Tennessee (bacillary)	85
Encephalitis, epidemic or lethargic:	
Alabama	2
German measles:	
Alabama	1
Tennessee	35
Impetigo contagiosa:	
Oregon	18
Jaundice, infectious:	
Oregon	9
Mumps:	
Alabama	72
North Dakota	15
Oregon	31
Tennessee	95

June 1937—Continued

	Cases
Ophthalmia neonatorum:	
Alabama	2
Tennessee	1
Paratyphoid fever:	
Tennessee	10
Puerperal septicemia:	
Tennessee	2
Rabies in animals:	
Alabama	79
Oregon	3
Rocky Mountain spotted fever:	
Oregon	9
Tennessee	1
Scabies:	
Oregon	10
Septic sore throat:	
Oregon	11
Tennessee	2
Tetanus:	
Alabama	2
Tennessee	2

June 1937—Continued

	Cases
Trachoma:	
Alabama	1
Tennessee	6
Tularaemia:	
Oregon	3
Tennessee	1
Typhus fever:	
Alabama	43
Tennessee	1
Undulant fever:	
Alabama	9
North Dakota	1
Tennessee	1
Vincent's infection:	
Oregon	14
Tennessee	10
Whooping cough:	
Alabama	248
North Dakota	69
Oregon	93
Tennessee	313

PLAGUE INFECTION IN SAN BERNARDINO COUNTY, CALIF.

Under date of July 29, 1937, Dr. W. M. Dickie, Director of Public Health of California, reported that plague infection had been proved by animal inoculation in a lot of 44 fleas collected from 11 *beecheyi* squirrels, shot on July 14, 1937, 6 miles south of Camp Angeles, San Bernardino County, Calif. Plague infection was also proved by animal inoculation in a lot of six fleas collected from seven *fisheri* squirrels on July 13, 1937, from the San Berdoo Y Camp, 5 miles southeast of Seven Oaks, San Bernardino County, Calif.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 24, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	120	40	14	1,036	309	410	7	386	84	1,309	-------
Current week	82	14	7	819	313	283	3	359	54	1,535	-------
Maine:											
Portland	0	------	0	0	1	0	0	0	0	6	17
New Hampshire:											
Concord	1	-----	0	0	1	0	0	0	0	0	7
Manchester	0	----	------	0	2	1	0	0	0	0	17
Nashua	0	------	-------	0	------	0	0	------	1	0	6
Vermont:											
Barre	0	-----	0	1	0	0	0	0	0	0	3
Burlington	0	-----	0	0	0	0	0	0	0	0	6
Rutland	0	------	0	0	0	0	0	0	0	0	3
Massachusetts:											
Boston	1	------	0	15	14	9	0	6	1	31	155
Fall River	2	------	0	5	2	1	0	1	1	3	41
Springfield	0	------	0	0	0	2	0	0	0	16	39
Worcester	0	------	0	1	2	2	0	1	3	7	50
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	1	15
Providence	0	-----	0	18	6	5	0	0	0	33	59
Connecticut											
Bridgeport	0	------	0	0	0	0	0	1	0	0	20
Hartford	0	------	0	4	0	0	0	3	0	4	39
New Haven	0	------	0	3	2	0	0	2	0	4	47
New York:											
Buffalo	0	-----	0	16	8	6	0	8	0	39	123
New York	17	6	2	125	69	16	0	84	6	121	1,313
Rochester	0	----	0	3	1	2	0	1	0	9	49
Syracuse	2	----	0	22	3	2	0	1	0	24	42
New Jersey.											
Camden	0	------	0	1	2	0	0	3	1	0	25
Newark	0	------	0	9	2	2	0	5	0	22	79
Trenton	0	------	0	14	2	1	0	2	0	0	30
Pennsylvania:											
Philadelphia	1	------	0	7	24	17	0	17	2	61	414
Pittsburgh	1	1	0	67	13	4	0	4	1	45	142
Reading	1	------	0	9	1	0	0	0	0	0	12
Scranton	0	-----	--------	2	------	2	0	-------	0	1	--------
Ohio:											
Cincinnati	0	1	0	14	0	1	0	4	2	38	105
Cleveland	2	2	1	82	7	19	0	11	0	56	175
Columbus	0	1	1	3	1	2	0	4	0	7	91
Toledo	0	1	1	24	2	4	0	1	3	57	62
Indiana:											
Anderson	0	------	0	11	1	1	0	0	0	33	9
Fort Wayne	0	------	0	1	1	0	0	0	0	2	21
Indianapolis	0	------	0	12	5	2	2	2	0	22	84

City reports for week ended July 24, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Indiana—Contd.											
Muncie	0		0	1	0	1	0	0	0	0	10
South Bend	0		0	0	0	0	0	1	0	0	12
Terre Haute	0		0	0	0	0	0	0	0	1	17
Illinois:											
Alton	0		0	1	0	0	0	1	0	1	5
Chicago	12		0	128	14	53	0	45	7	97	598
Elgin	0		0	0	0	0	0	0	0	3	8
Moline	0		0	0	0	0	0	0	0	8	10
Springfield	0		0	2	2	0	0	0	1	5	24
Michigan:											
Detroit	11		0	53	12	46	0	18	2	103	239
Flint	0		0	0	5	6	0	0	0	3	22
Grand Rapids	0		0	17	0	0	0	1	0	46	23
Wisconsin:											
Kenosha	0		0	0	0	1	0	0	0	0	5
Madison	0		0	1	0	0	0	0	0	8	12
Milwaukee	0		0	8	4	7	0	6	0	36	87
Racine	0		0	0	0	3	0	0	0	0	13
Superior	0		0	0	0	0	0	0	0	11	6
Minnesota:											
Duluth	0		0	1	0	0	0	1	0	5	20
Minneapolis	0		0	0	4	6	0	1	0	13	92
St. Paul	0		0	1	1	1	0	2	0	69	38
Iowa:											
Cedar Rapids	0			1		1	0		0	3	
Davenport	0			0		1	0		1	1	
Des Moines	0			0		7	0		0	2	24
Sioux City	0			1		3	1		0	2	
Waterloo	1			2		1	0		1	0	
Missouri:											
Kansas City	2	1	0	4	7	1	0	7	1	11	81
St. Joseph	0		0	2	2	1	0	0	0	2	13
St. Louis	1		0	26	4	11	0	11	4	34	179
North Dakota:											
Fargo	0		0	0	0	0	0	0	0	32	3
Grand Forks	0			0		0	0		0	4	
Minot	0		0	0	0	0	0	0	0	0	2
South Dakota:											
Aberdeen	0			0		0	0		0	0	
Nebraska:											
Omaha	0		0	0	1	0	0	2	0	3	40
Kansas:											
Lawrence	0			0		0	0		0	2	
Topeka	0		1	0	1	0	0	0	0	6	40
Wichita	0		0	0	1	1	0	1	0	6	15
Delaware:											
Wilmington	0		0	0	2	1	0	1	0	10	28
Maryland:											
Baltimore	5		0	11	10	4	0	13	2	102	194
Cumberland	0		0	0	0	0	0	0	0	3	10
Frederick	0		0	0	0	0	0	0	0	0	2
Dist. of Col.:											
Washington	4		0	20	5	3	0	8	2	13	150
Virginia:											
Lynchburg	2		0	2	1	0	0	0	0	8	16
Norfolk	0		0	7	3	0	0	1	0	8	35
Richmond	0		0	2	4	0	0	1	0	1	54
Roanoke	2		0	3	0	2	0	0	1	1	11
West Virginia:											
Charleston	0		0	0	0	0	0	0	0	0	7
Huntington	0			0		0	0		0	0	
Wheeling	0		0	0	0	3	0	1	0	16	10
North Carolina:											
Gastonia	0			0		0	0		0	1	
Raleigh	0		0	0	0	0	0	0	0	13	12
Wilmington	0		0	1	0	1	0	0	0	18	7
Winston-Salem	0		0	1	1	1	0	0	0	10	15
South Carolina:											
Charleston	0		0	0	1	2	0	0	1	0	23
Florence	0		0	0	0	0	0	0	0	0	5
Greenville	0		0	0	0	0	0	0	0	2	8
Georgia:											
Atlanta	0		0	0	11	2	0	3	1	30	93
Brunswick	0		0	0	1	0	0	0	0	0	3
Savannah	0		0	0	0	0	0	1	2	1	21

City reports for week ended July 24, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Florida:											
Miami	0	1	0	1	2	0	0	3	0	0	43
Tampa	0		0	0	1	0	0	1	0	8	23
Kentucky:											
Ashland	0		0	1	1	0	0	1	0	0	16
Covington	0		0	0	0	0	0	0	0	17	
Lexington	0		0	0	1	0	0	1	0	7	
Louisville	0		0	19	2	6	0	2	0	90	58
Tennessee:											
Knoxville	0		0	0	1	0	0	0	2	0	33
Memphis	1		0	16	1	2	0	4	0	18	83
Nashville	2		0	3	1	0	0	1	0	4	37
Alabama:											
Birmingham	1		0	5	3	2	0	2	0	5	66
Mobile	0		0	0	2	0	0	1	0	0	26
Montgomery	0			0		0	0		0	0	
Arkansas:											
Fort Smith	0			0		0	0		0	2	
Little Rock	0		0	0	3	1	0	3	0	0	8
Louisiana:											
Lake Charles	0		0	0	1	0	0	0	0	0	3
New Orleans	6		0	0	1	3	0	6	4	21	117
Shreveport	0		0	0	4	0	0	1	0	0	52
Oklahoma:											
Muskogee	0			0		0	0		0	0	
Texas:											
Dallas	1		0	1	5	0	0	2	2	10	56
Fort Worth	1		0	0	2	3	0	1	0	3	40
Galveston	0		0	0	1	1	0	1	0	0	17
Houston	0		0	4	3	1	0	7	0	2	65
San Antonio	0		0	1	5	0	0	5	0	1	72
Montana:											
Billings	0		0	0	1	0	0	0	0	0	2
Great Falls	0		0	0	0	0	0	0	0	8	4
Helena	0		0	0	0	2	0	0	0	0	3
Missoula	0		0	0	1	0	1	0	0	0	7
Idaho:											
Boise	0		0	0	1	0	0	0	0	2	5
Colorado:											
Colorado Springs	0		0	1	0	0	0	1	0	1	12
Denver	2		0	16	6	2	0	2	1	34	65
Pueblo	0		0	1	1	1	0	1	0	0	7
New Mexico:											
Albuquerque	1		0	5	0	2	0	1	0	0	15
Utah:											
Salt Lake City	0		1	39	1	4	0	2	0	13	41
Washington:											
Seattle	0		0	6	1	1	0	5	2	33	78
Spokane	0		0	7	0	0	0	1	1	4	33
Tacoma	0		0	0	0	0	0	0	0	3	13
Oregon:											
Portland	0		0	1	3	1	1	3	0	1	78
Salem	0			0		0	0		0	0	
California:											
Los Angeles	2	1	1	5	5	8	0	22	0	59	279
Sacramento	0		0	1	3	2	0	2	1	7	23
San Francisco	0	1	0	0	2	4	0	6	2	44	162

City reports for week ended July 24, 1937—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases	State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths			Cases	Deaths	
Massachusetts:				Maryland:			
Boston	2	0	5	Baltimore	2	3	1
Rhode Island:				Virginia:			
Pawtucket	1	0	0	Richmond	2	0	0
New York:				West Virginia:			
New York	5	2	5	Charleston	0	0	1
New Jersey:				Wheeling	1	1	0
Trenton	0	0	1	North Carolina:			
Pennsylvania:				Wilmington	0	0	1
Philadelphia	1	1	0	Georgia:			
Ohio:				Atlanta	1	0	0
Cincinnati	1	1	11	Kentucky:			
Toledo	1	0	0	Louisville	0	0	1
Indiana:				Tennessee:			
Muncie	0	0	1	Memphis	0	0	1
Illinois:				Arkansas:			
Chicago	0	0	3	Fort Smith	0	0	1
Michigan:				Little Rock	0	0	5
Detroit	0	0	2	Louisiana:			
Wisconsin:				Shreveport	0	1	0
Milwaukee	1	1	0	Texas:			
Minnesota:				Dallas	1	1	0
Minneapolis	0	0	1	Galveston	0	0	1
Missouri:				Houston	1	0	0
Kansas City	0	0	4	San Antonio	0	0	1
St. Louis	0	0	2	Oregon:			
Nebraska:				Portland	1	1	0
Omaha	0	0	4	California:			
Delaware:				Los Angeles	0	0	2
Wilmington	0	0	1	San Francisco	0	0	2

Pellagra.—Cases: Washington, 1; Savannah, 3; Tampa, 1; Nashville, 1; Montgomery, 1; Fort Smith, 3; Houston, 1.

Typhus fever.—New York, 2; Atlanta, 2; Savannah, 2; Nashville, 1; Birmingham, 1; Mobile, 2; Fort Worth, 1; San Antonio, 1.

FOREIGN AND INSULAR

LATVIA

Communicable diseases—January–May 1937.—During the months of January, February, March, April, and May, 1937, cases of certain communicable diseases were reported in Latvia as follows:

Disease	January	February	March	April	May
Botulism	1	1	1	1	3
Cerebrospinal meningitis	12	11	13	6	1
Diphtheria	75	81	44	36	43
Erysipelas	45	62	59	50	40
Influenza	966	435	300	153	41
Leprosy	1		1	3	
Lethargic encephalitis		1			
Malaria					1
Measles	4	5	14	1	2
Mumps	16	5	65	94	42
Paratyphoid fever	5		3	2	21
Poliomyelitis				1	1
Puerperal septicemia	11		7	8	5
Scarlet fever	297	357	437	371	247
Tetanus		1			2
Trachoma	60	97	45	45	27
Tuberculosis	276	285	310	336	311
Typhoid fever	36	[1] 54	29	28	30
Typhus fever			1	1	
Whooping cough	124	121	96	117	128

[1] Includes paratyphoid fever.

PANAMA CANAL ZONE

Notifiable diseases—April–June 1937.—During the months of April, May, and June, 1937, certain notifiable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	April		May		June	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chicken pox	3		6		5	
Diphtheria	5	2	11		6	
Dysentery (amebic)	10		7		10	
Dysentery (bacillary)		3			5	2
Leprosy	1	1				
Malaria	54	1	90	1	259	4
Measles	31		15		6	
Meningococcus meningitis			1	1	1	
Mumps	20		23		28	
Pneumonia		16		25		28
Relapsing fever			1		1	
Scarlet fever			1			
Tuberculosis		34		35		28
Typhoid fever	2	2			1	
Typhus fever			2			
Whooping cough	2		9	1	9	1

SWEDEN

Notifiable diseases—March–May 1937.—During the months of March, April, and May, 1937, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	March	April	May	Disease	March	April	May
Cerebrospinal meningitis	6	4	3	Poliomyelitis	28	32	29
Diphtheria	7	20	33	Scarlet fever	1,356	1,202	1,361
Dysentery	6		9	Syphilis	32	23	23
Epidemic encephalitis		2	11	Typhoid fever	4	6	9
Gonorrhea	778	932	914	Undulant fever	14	19	17
Paratyphoid fever	4	21	34				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for July 30, 1937, pp. 1054–1068. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued August 27, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

China—Hong Kong.—On July 26, 1937, one case of cholera was reported in Hong Kong, China.

Federated Malay States.—According to a recent report, two deaths from cholera were reported in the Federated Malay States during the week ended July 3, 1937. It was stated that cholera had not been reported in the Federated Malay States since 1927.

Siam.—A report dated July 7, 1937, from the American Consulate General at Bangkok, Siam, states that the cholera epidemic has been suppressed in Bangkok and reduced to negligible proportions throughout Siam.

Cases and deaths for the whole country since the beginning of the epidemic are as follows:

Month	Cases	Deaths
1936		
December	184	126
1937		
January	855	517
February	1,339	863
March	1,803	1,195
April	2,954	1,928
May	1,301	780
June	295	209

For the week ended July 3, there were 36 cases and 26 deaths in the entire country, while no cases or deaths were reported from Bangkok. During the week ended July 10, 1 case was reported in Bangkok, and during the week ended July 17, 1 case with 1 death was reported.

Plague

Peru.—During the month of June 1937, plague was reported in Peru as follows: Lambayeque Department, Chiclayo, 1 case; Libertad Department, Trujillo, 1 case; Salaverry, 1 case, 1 death; Lima Department, San Vicente, 1 case.

Tunisia—Tunis.—According to information dated July 23, 1937, 1 case of bubonic plague was reported in Tunis, Tunisia.

United States—California—San Bernardino County.—A report of plague infection in 2 lots of fleas taken from ground squirrels in San Bernardino County, Calif., appears on page 1128 of this issue of PUBLIC HEALTH REPORTS.

Yellow Fever

Brazil.—On July 9, 1937, 1 death from yellow fever was reported in Santa Izabel, Para State, Brazil.

French Equatorial Africa—Libreville.—On July 28, 1937, 1 fatal case of yellow fever was reported in Libreville, French Equatorial Africa.

Gold Coast.—On July 28, 1937, yellow fever was reported in Gold Coast as follows: Amasaman, 1 case; Bisa, 1 case; Nuaso, 1 case; Ozpom, 1 case. On July 21, 1 case of yellow fever was reported in Mepom, Gold Coast.

Nigeria.—On July 28, 1937, 1 case of yellow fever was reported in Ibadan, Nigeria. A fatal case of yellow fever was reported at Ogbomosho, Oyo Province, on July 22.

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg Gen ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States, insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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EXPERIMENTAL MENINGITIS IN GUINEA PIGS[1]

By S. E. BRANHAM, *Senior Bacteriologist*, R. D. LILLIE, *Surgeon*, and A. M. PABST, *Junior Bacteriologist*,[2] *United States Public Health Service, National Institute of Health*

In November 1931 a study of the effects of intra cisterna magna injections of meningococci and meningococcus products in rabbits and guinea pigs was begun. The studies with rabbits, published in 1932 (*1*, *2*), showed that a meningitis could be induced by living or heat-killed meningococci and also by filtrates of meningococci. Our earlier experiments with guinea pigs were reported briefly in 1932 (*3*). The present paper represents a continuation of these studies.

EXPERIMENTAL WORK WITH GUINEA PIGS

(*A*) *Animals, material, and technique used.*—Young guinea pigs, weighing 200 to 250 grams, were injected intracisternally, under ether anesthesia, with living cultures of meningococci, with heat-killed cultures, with filtered suspensions of living cultures, and with broth filtrates. Weight and temperature were recorded daily for each animal as long as it was under observation.

The cultures were of freshly isolated strains. For injection, these cultures were grown for 18 hours on blood agar slants, and suspensions in Ringer's solution were prepared as for rabbits (*2*). The dose given to guinea pigs usually varied from 10,000,000 to about 100,000,000 meningococci, depending on the virulence of the strain. The number of meningococci injected was contained in a volume of 0.2 to 0.3 cc of Ringer's solution. Larger volumes by this route were avoided as far as possible in order to prevent the occurrence of increased intracranial pressure.

The killed cultures were prepared in the same way as were the living, but the suspensions were boiled for 5 minutes before being injected. The volume of the dose was the same as that with the living bacteria, but the number of meningococci contained in it was usually much greater—sometimes several billion.

The filtered suspensions were prepared as for the production of the Shwartzman reaction (*4*), but no preservative was added and suspensions were filtered through Berkefeld N filters. A very small amount of these filtered suspensions represented the washings of a tremendous

[1] Read before the Society of American Bacteriologists, at Ann Arbor, Mich., December 1932.
[2] Miss Pabst died on Dec. 25, 1935, of meningococcus septicemia, acquired in line of duty.

number of bacteria. The broth filtrates were prepared by the method described by Ferry (*5*).

The amount of filtered suspensions and of filtered broth cultures used for injection did not exceed 0.3 cc in any case, and was usually 0.1 to 0.15 cc.

(*B*) *Effects of injections with living cultures.*—The newly isolated strains of meningococci varied greatly in their virulence for guinea pigs. This was true even of the primary cultures from spinal fluids. Certain strains—i. e., strains 403 and 541—in amounts of 10,000,000 meningococci regularly killed 100 percent of the animals. Other strains in similar doses killed only a small percentage, while still others failed to induce any symptoms.

The clinical pictures found in guinea pigs were less constant than those noted in rabbits. The "incubation period" after injection was usually 3 to 5 hours. During this time the animals seemed quite well, though not always lively. The first signs noted were dyspnea and a tendency for the head to be held to one side. This stage, which was usually transient, was not accompanied by rigidity of the neck. The animal's fur was ruffled and it sat huddled in obvious discomfort. That this discomfort was chiefly in the back of the head was indicated by the character of the efforts made by the animals to get rid of it, for they dodged from side to side and frequently tried to scrape it off with their paws. In some guinea pigs there were no other symptoms, and the animals seemed quite recovered by the next day. In some, this stage was followed by violent shivering and hypersensitiveness to touch; in others, peculiar convulsive, rhythmical jerking appeared. As the clinical picture developed, the jerking was often followed by prostration, and by a more or less complete paralysis of the hind legs. Coughing, convulsions, and hemorrhage from the nose often appeared. Although death occurred as early as 4 hours after injection and as late as 4 days, as a rule it came most often between 8 and 24 hours. Recovery took place in some animals that had extensive paralysis, whereas death occurred in some whose symptoms were much less marked. Generally, the prognosis was poor for those guinea pigs in which paralysis had developed.

In some of these animals the disease ran a more chronic course. These developed marked opisthotonos and rigidity, and went into tetanic spasms when touched or jolted. Usually the temperature fell several degrees. One of these guinea pigs (H–15) is described in protocol 3. Protocols 1 (D–3) and 2 (J–1) present guinea pigs showing the more acute pictures. In general, it may be said that the injection of living virulent cultures of meningococci into guinea pigs may result in (*a*) a convulsive form (protocol D–3), (*b*) a paralytic form (protocol J–1), and (*c*) a more chronic form with spasticity, rigidity, and opisthotonos (protocol H–15).

(*C*) *Effects of injections with killed cultures.*—Twenty guinea pigs were given intracisternal injections of suspensions of the strains used in (B) boiled 5 minutes. Eight of these developed symptoms resembling the paralytic form of meningitis described above, and seven of them died within 12 hours. The animals that died received at least 200,000,000 meningococci in a volume of 0.2 to 0.3 cc of Ringer's solution. Those receiving a smaller number of the bacteria remained well or were only slightly affected. It is well known that the thermostable "endotoxins" of meningococci will kill animals when given in sufficiently large quantities by various routes. This was noted as early as 1901 by Albrecht and Ghon (*6*), and has been discussed by many workers (*7*) since, e. g., Kolle and Wassermann, Flexner, Kraus and Doerr, Dopter, Gordon, Neill and Taft, and others.

(*D*) *Effects of injections with filtered suspensions.*—In order to get a clearer idea of whether the "toxins" of the meningococcus remained chiefly within the intact bacterial cells, or were dissolved in the menstruum of the suspension, Berkefeld N filtrates of suspensions of 4 different strains were given intracisternally to 24 guinea pigs. These filtrates represented massive doses, as the suspensions from which they were made were heavy. Only 4 of these guinea pigs remained unaffected, and of the 20 which developed definite symptoms, 18 died within 14 hours after injection. The outstanding symptoms were marked dyspnea and extreme prostration after an incubation period which was usually 3 to 4 hours.

(*E*) *Effects of injections of broth culture filtrates.*— It was at this time that Dr. Ferry and his associates reported the production of soluble toxins in broth cultures by meningococci. Berkefeld N filtrates of 6- to 10-day broth cultures were prepared by us after their method (*5*), choosing for study those from strains which produced the heaviest pellicles. From 0.1 to 0.3 cc of these, and of various dilutions of them, were given to guinea pigs intracisternally as described above.

These filtrates varied widely in their toxicity. Some of the "toxins" were too weak to do more than produce the mildest symptoms when given undiluted; others killed as many as 80 percent of the guinea pigs that were given 0.1 to 0.2 cc of 1:5 dilutions. More than 300 guinea pigs were studied altogether with these "toxins." The clinical picture found in them was essentially that found in the animals given the materials described above—in other words, that of a typical meningitis. The incubation period varied from 2½ to 6 hours, and death usually occurred in 8 to 24 hours.

(*F*) *Effect of injection of control materials.*—Ten guinea pigs were injected intracisternally as follows: 3 with diluted india ink, 0.1 cc, 0.2 cc, and 0.3 cc, respectively; one with 0.1 cc of undiluted ink; 3 with 0.85 percent NaCl solution, 0.3 cc; and 3 with 0.1 cc, 0.2 cc, and 0.3 cc, respectively, of 1 percent glucose broth. None of the animals

showed any symptoms whatever. Obviously neither the volume given nor the mere presence of inert foreign material played a role in producing meningitis in guinea pigs as described above.

(*G*) *Autopsy findings.*—Most of the animals that died were autopsied, and some that showed no symptoms, or that recovered, were chloroformed and studied similarly. Cultures on rabbits' blood agar were made from cisternal fluid drawn just before autopsy from the surface of the brain and from the heart. Smears of cisternal fluid or from the surface of the brain were stained by Wright's and Gram's methods. In those instances in which postmortem changes could be ruled out, the brain was removed for histological examination.

Gross findings at autopsy were not conspicuous and consisted chiefly of adherence of the meninges, sometimes pus, especially between the cerebellum and the hemispheres, and usually congestion.

The stained smears usually showed large numbers of leucocytes; but, unless the animal was autopsied immediately after death, these leucocytes had degenerated so far that the presence or absence of bacteria could not always be thus detected. Gram-negative diplococci of characteristic morphology were seen in smears from 65 percent of the guinea pigs which died after receiving living cultures. Occasionally a number of lymphocytes were also present.

(*H*) *Bacteriological studies.*—Meningococci were recovered from the cisternal fluid drawn just before autopsy from about 25 percent of the guinea pigs dying after injection with living cultures. In about 5 percent they were found in the blood. Most of these strains were found by agglutination to be identical in serological grouping with the strains that were injected. Other strains were nonagglutinable. All were recovered from pigs that died within 24 hours after injection.

Microorganisms other than the meningococcus were recovered from both cisternal fluid and from blood in a number of guinea pigs. These were usually strains belonging to the *Pasteurella* group, though there was occasionally a hemolytic streptococcus or a staphylococcus. These occurred regardless of the nature of the inoculum, and practically always in animals that died after several days when recovery from the primary meningitis seemed well under way. Death in these cases was seemingly due to secondary or superimposed infection. On account of such cases it seemed essential that a careful bacteriological study be made of all guinea pigs that died in the course of these experiments before assuming that their death was due to meningococci or their products.

PATHOLOGIC HISTOLOGY

In guinea pigs, as in rabbits, a purulent meningitis was produced alike by living meningococci, by killed cultures, by Berkefeld filtrates of suspensions from agar cultures (hereafter referred to as suspension filtrates), and by filtrates of broth cultures.

FIGURE 1.—Guinea pig A1. Fibrinopurulent meningitis, base of midbrain Died 11-12 hours after injection.

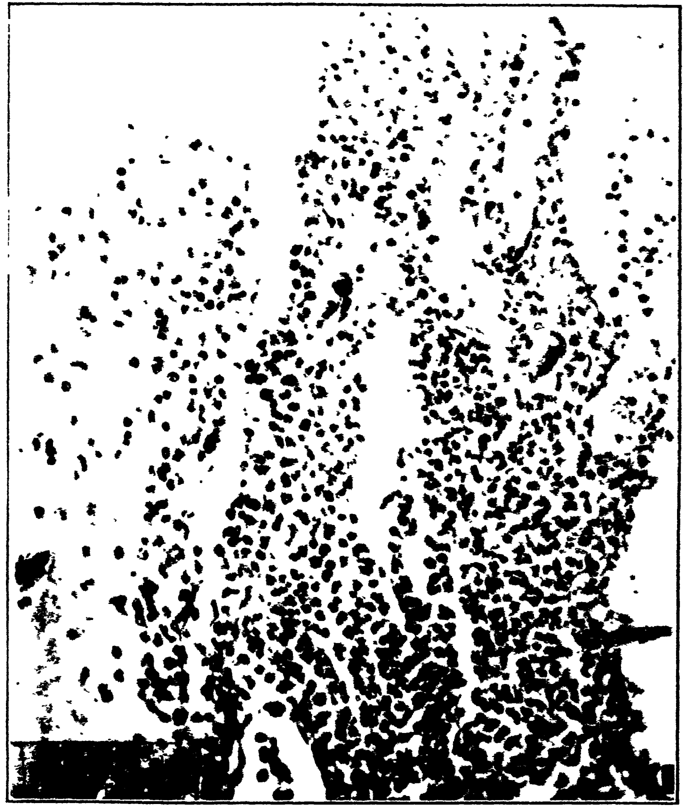

FIGURE 2 - Guinea pig A7. Purulent meningeal infiltration, midbrain Died 48 hours after injection

FIGURE 3.—Guinea pig A7. Purulent infiltration of choroid plexus, with purulent exudate in lateral ventricle

FIGURE 4.—Guinea pig A6. Purulent infiltration of wall of lateral ventricle

The meningeal exudate appeared in 3 to 5 hours, much earlier than in rabbits. It was predominantly purulent in character (figs. 1 and 2), denser on the base of the brain and between the brain stem and the occipital cortex, and was often accompanied by congestion and hemorrhage. Fibrin was most often evident after inoculation with killed cocci. Demonstrable fibrin exudation was infrequent with the other inocula. Similarly, purulent thrombi in meningeal vessels were frequent after inoculation with killed cocci and infrequent with the other inocula.

The sheaths of perforating and, less often, deep vessels were often infiltrated by purulent exudate. Occasionally the purulent infiltration extended to the perivascular parenchyma. Purulent thrombosis was not infrequent, being especially common after inoculation with killed cocci.

Purulent exudate in the ventricles (fig. 3) occurred in the great majority of the animals inoculated with living or killed cultures and in about 75 percent of those receiving broth filtrates and dying in less than 30 hours, but was infrequent with the suspension filtrates. Choroid plexus infiltration was correspondingly frequent. With the broth filtrates this infiltration was as often predominantly purulent as lymphocytic in character, while with living or killed cocci lymphocytes tended to dominate.

Purulent infiltration of the brain substance abutting on the meninges or ventricles (fig. 4) was found in over 50 percent of the animals inoculated with cultures or broth filtrates. The few inoculated with suspension filtrates showed this condition infrequently. Such marginal purulent infiltration was more frequent and more marked in guinea pigs than in rabbits.

Other less frequent features of the process were perivascular hemorrhages, miliary marginal or central abscesses, and suppurating ependymal ulcers in the ventricles.

Pericellular edema in the cerebral cortex and tigrolysis and vacuolation in the nuclei of the brain stem were frequent findings, especially in animals surviving over 12 hours.

In subsiding reactions the meningeal exudate decreased in amount and became partly or entirely lymphocytic in character, the involvement of intracerebral vessel sheaths disappeared and the ventricular exudates decreased and disappeared. The ventricles were often reduced to slit-like spaces, and the plexal villi sometimes agglutinated into masses with some pus between. Plexal infiltration became lymphocytic or disappeared entirely. Purulent infiltrations of the brain substance were infrequent in late stages. With filtrates and killed cultures evidence of subsidence was noted early on the second day, while with living cultures no decrease in the reaction was apparent until after 3 days. In 8 of the 9 extensive purulent meningitides persisting to

the third to fifth day after broth filtrate inoculation, secondarily invading organisms were demonstrated in the meninges either by culture or in sections.

This account is based on the study of the brains from 44 guinea pigs inoculated with living cultures, 12 with heat-killed cultures, 18 with suspension filtrates, and 104 with broth filtrates.

DISCUSSION

Meningitis can be produced in guinea pigs more readily than in rabbits by intracisternal injection of meningococci or their products.

Apparently a true infection results if the strains used are sufficiently virulent. The meningococci can be seen in stained smears of cisternal fluid or of the brain surface, and they can be recovered usually in pure culture from these sources.

This infection usually remains localized, and in such cases the possibility that the meningococci which are recovered represent survivors of the inoculum must be considered. But sometimes the meningococci invade the blood stream, causing a generalized infection, and they can be recovered from the blood in pure culture. In such cases true infection can not be doubted. It is only very virulent strains which can produce such infection, and many recently isolated strains are without effect when given in the amounts used in these experiments.

Nonvirulent and heat-killed meningococci can also produce meningitis in guinea pigs when injected intracisternally in sufficiently large numbers. Such meningitis is not an infection and the microorganisms can not be recovered at autopsy. This toxicity of meningococci, whether killed or living, has been recognized for many years, and has been responsible for the general belief that meningococcus infection could not be produced in small laboratory animals, but that their death was due wholly to intoxication by the massive doses of meningococci given. Meningococci became so quickly attenuated in the laboratory that very little work was done with strains that possessed real virulence. If a culture had lost its virulence it made little difference whether it were killed or living in its effect upon the animals to which it was given.

Berkefeld filtrates of heavy suspensions of meningococci in Ringer's solution also produced meningitis when injected intracisternally into guinea pigs. Meningococci autolyze very rapidly, and it is uncertain whether the toxicity of these filtered washings is due to dissolved bacterial substance or to some substance washed from the outside of the cells. In either case, a small amount of the filtrate represented a very large number of meningococci.

Broth culture filtrates of certain strains of meningococci likewise produced meningitis on intracisternal injection. Relatively few

strains yielded strongly toxic filtrates but these few were consistent in their toxin production, though some lots were less potent than others. The "toxin"-producing property of meningococci was found to be less transient than virulence and was always associated with pellicle formation in the broth cultures.

Meningitis in guinea pigs, as described above, was not due to mechanical irritation or to the mere presence of foreign material, as was shown by intracisternal injections of broth, salt solution, and india ink, as well as filtrates of nontoxic strains and suspensions of other kinds of killed bacteria.

The clinical and pathological pictures that were found in the meningitis produced by living and killed cultures and by filtrates were essentially the same. This was to be expected, since meningitis is an inflammation of the meninges, and as such would have the same symptoms and pathology resulting from any cause which would produce a purulent exudate.

CONCLUSIONS

It appears that meningococcus meningitis in guinea pigs may be either (*a*) an infection or (*b*) an intoxication.

True infection has been found to occur only when strains of meningococci of marked virulence were used. Meningococci could be recovered from the cisternal fluid and brain surface, and sometimes from the heart blood.

Nonvirulent and killed meningococci caused meningitis when large numbers were given. Death in such cases was probably due to an intoxication.

"Toxins" produced by Ferry's method in broth cultures of certain strains of meningococci could also produce meningitis in guinea pigs

In both infection and intoxication the clinical and histopathological pictures were the same.

Protocol 1

(Guinea pig D-3)

December 3, 1932: Weight, 275 gm; temperature, 38.5° C. Given 0.1 cc of living suspension of strain 433 (10 million cocci) intracisternally at 11 a. m. Lively after injection.

At 2 p. m. head was drawn to right; the animal shivered violently and constantly, and scratched his nose vigorously.

At 2:50 p. m. spasmodic jerking began. The head was held almost at a right angle to the body. The jerking became more violent, finally convulsions ensued, and death occurred at 6 p. m., 7 hours after injection. Placed in icebox overnight. Autopsied 10:30 a. m. on December 4, 1932. Stained smears from brain surface showed abundant polymorphonuclear leucocytes. No cocci definitely identified.

Brain.—Fibrinopurulent meningeal exudate most marked on base of cerebrum, thalamus, pons, medulla, and all around midbrain. Little pus in third ventricle purulent infiltration of choroid plexus of fourth ventricle patchy round cell

infiltration of plexus of both lateral ventricles, marginal leucocyte infiltration of brain substance in pons and occipital cortex.

Diagnosis.—Acute purulent leptomeningitis.

Protocol 2

(Guinea pig J-1)

August 24, 1932: Weight, 225 gm; temperature, 40.0° C. Given 0.2 cc of living suspension of strain 479 (20 million cocci) intracisternally at 10 a. m. Well and lively after injection.

At 3 p. m. much prostrated; lost use of hind legs completely. Died at 6:30 p. m. Kept in icebox overnight. Autopsied 11:30 a. m. on August 25, 1932.

There was very little cisternal fluid. Smears showed disintegrated leucocytes and cocci chiefly in pairs. Pure culture of a group I–III meningococcus (strain 479 was of group I–III) was obtained.

Brain.—Pus in ventricles, foci of purulent infiltration in walls of lateral ventricles, floor of fourth ventricle and sides of third ventricle. Purulent thrombosis of scattered intracerebral vessels with purulent infiltration of surrounding brain tissue. Scattered small hemorrhages in brain stem. Diffuse purulent meningeal infiltration, more marked basally and in major fissures, less and partly lymphoid over convexity, accompanied by purulent infiltration of brain substance on base of cerebrum and pons.

Diagnosis.—Acute purulent meningitis.

Protocol 3

(Guinea pig H-15)

August 22, 1932: Weight, 230 gm; temperature, 38.0° C. Given 0.2 cc of living suspension of strain 487 (10 million cocci) intracisternally at 11 a. m. Animal well and lively after injection.

August 23, 1932: Weight, 220 gm; temperature, 36.0° C. Completely prostrated, paralyzed posterior extremities, apparently *in extremis.*

August 24, 1932: Marked opisthotonos. Tetanic spasms when touched or jolted.

August 25, 1932: Died at 8 a. m. Autopsied 9 a. m.

Smears from cisternal fluid showed monocytes, disintegrated polymorphonuclear leucocytes, and abundant gram-negative cocci.

Brain.—Marked pericellular edema and cell hydrops in cortex, tigrolysis in stem ganglia, empyema of lateral ventricles with softening, hemorrhages, small abscesses and purulent infiltration of adjacent brain tissue, pus in third and fourth ventricles, purulent meningeal infiltration especially on base and in major fissures.

Diagnosis.—Acute purulent meningitis.

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SERUM STUDIES IN EXPERIMENTAL MENINGITIS

Lack of Protection for Rabbits and Guinea Pigs[1]

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It has seemed as though the greatest obstacle in the way of satisfactory evaluation of therapeutic antimeningococcic serums was the lack of success in producing meningococcus infection with dependable regularity in the smaller laboratory animals.

In August 1932 we described meningitis in rabbits (*1*) following intracisternal injections of recently isolated meningococci.

In December of the same year we reported, briefly, similar experimental meningitis in guinea pigs (*2*). A more detailed description of meningitis in guinea pigs is contained in a recent report (*3*).

In these animals, meningitis may be a true infection when highly virulent strains of meningococci are used, or an intoxication when large amounts of cultures of lower virulence are used. Meningitis due to "toxins", possibly, though not certainly, of a different nature, is produced by injection of broth culture filtrates of some strains of meningococci.

In the present paper we wish to report some of our studies on the effect of antimeningococcic serums on meningitis in both rabbits and guinea pigs.

To produce meningitis, two types of materials were used: (*a*) Newly isolated virulent cultures of meningococci and (*b*) toxic Berkefeld filtrates of 6-day broth cultures prepared after the method of Ferry (*6*) from several older strains which had been found to produce filtrates of marked toxicity. Most of the cultures were of strains which had been isolated only a few days previous to the experiments and had been shown to have unusual virulence for mice.

I. EFFECT OF SERUM WITH VIRULENT CULTURES

Eighteen-hour rabbit-blood agar slant cultures were suspended in Ringer's solution of pH 7.0–7.4. These suspensions were further diluted to correspond in density with standard suspensions of silica (*4*) so that the approximate number of micro-organisms injected was known. The number of meningococci injected was usually from 10,000,000 to 100,000,000, depending on the virulence of the strain. The volume was 0.2 to 0.3 cc. Injections were made intracisternally under ether anesthesia.

The 17 strains used in these serum studies were, on the whole, more virulent than those used in the earlier studies, and there was a tendency for the meningitis produced to follow the form especially

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[1] Read before the Society of American Bacteriologists in New York City, Dec. 26, 1935.

[2] Miss Pabst died on Dec. 25, 1935, of meningococcus septicemia acquired in line of duty.

characterized by spasticity, opisthotonos, and hyperirritability (*1*) (*3*). With this form the animals frequently lived several days, and it was possible to follow the course of the disease in the rabbits by daily intracisternal puncture. Very cloudy fluids under increased pressure, and with cell counts of more than 100,000, were usually obtained. Differential cell counts with these spinal fluids showed a great preponderance of polymorphonuclear leucocytes. Intracisternal fluid was not easily obtained from guinea pigs.

The serum used in the experiments with living cultures included 12 polyvalent antimeningococcic horse serums from 6 different sources, 3 antitoxins (horse), and 5 normal horse serums.

During the earlier of these experiments the serum and culture suspension were mixed together and then injected intracisternally. The number of meningococci to be given was determined by preliminary experiments in which a constant volume of inoculum containing varying amounts of culture suspension was injected. An amount that would cause the death of at least 3, and preferably 4, out of 4 guinea pigs in 48 hours was taken as a standard dose, and this amount was mixed with 0.2 cc of serum to give a final volume of 0.3 cc. In some of the experiments with large rabbits, greater amounts of serum were used, but the total volume injected never exceeded 0.5 cc for these animals and 0.3 cc for guinea pigs. Guinea pigs were injected in quadruplicate and rabbits in duplicate or triplicate. Similar groups were given culture with normal serum, and also culture alone, to check the virulence of the strain used. Thus, a large number of animals was necessarily used. In experiments with antitoxin and with the usual polyvalent antimeningococcic serums, all made in horses, it was evident that there was no protection afforded by the amounts of serums given by this route. Appreciably larger quantities given intracisternally would cause an undesirable sudden increase in intracranial pressure.

The addition of fresh guinea pig complement to the serums before injection had no noticeable effect.

The effect of the horse serums alone when given intracisternally was studied. Here, polyvalent antimeningococcic serum, antitoxin, and normal horse serums were included. Apparently, some horse serum in itself has considerable toxicity for rabbits and guinea pigs when given by this route, and a meningitis often resulted which was similar clinically and histologically to that produced by the suspensions of meningococci.[3] This toxicity had no relation to the preservatives used in the serums, but is a property of the horse serum itself; guinea pigs were given, intracisternally, the same concentra-

[3] The brains of 44 guinea pigs that had received serum, serum+toxin, and serum+meningococci were examined histologically by Passed Asst. Surg. J. G. Pasternack. The findings were essentially the same as those which were described in detail in a former report (*3*).

tions of the preservatives that are used in the serums, with no ill effects. None of the normal rabbit and guinea pig serums tested showed any toxicity.

Since it was shown so clearly that horse serum is likely to be toxic when given intracisternally, and since the amount of any material that can be given by that route is very limited, it was decided to try the effect of injecting the serum intravenously, thus giving larger amounts. In some experiments the serum was given immediately preceding or following the intracisternal injection of the culture; in others, the serum preceded the culture by two hours or more. This intravenous administration of serums gave very little evidence, if any, of protection. There was no constant difference in effect between the immune serums and normal horse serum. A somewhat larger number of animals survived among those receiving the antitoxins, but the difference was not great enough to be significant.

Protection experiments in which amounts of serum as great as 4 to 6 cc were given intraperitoneally were entirely negative.

Most of the animals in which the meningitis was fatal died within 24 hours; but there were quite a number, especially among the rabbits, in which the disease ran a longer course. In some of these animals it was thought that frequent injections of serum might result in improvement, whereas a single initial injection had seemed useless. In a number of rabbits this course was followed, the serum being given intravenously daily, or twice daily, usually following the cisternal tap. These subsequent injections of serum not only failed to produce improvement, but actually seemed to hasten the death of the animals.

Although it has been relatively easy to produce acute purulent meningitis in rabbits and guinea pigs by intracisternal injections of virulent meningococci, it has not been possible to prevent or cure it by intracisternal, intraperitoneal, or intravenous administration of either the usual polyvalent antimeningococcic serums or of antitoxins.

II. EFFECT OF SERUMS WITH TOXINS

The "toxins" used in these experiments were sterile Berkefeld N filtrates of meningococcus cultures grown for 4 to 6 days in a special broth after the method of Ferry (*5*). Not all strains of meningococci yielded filtrates of equal toxicity; they varied widely in this respect. A few strains proved to be consistently good "toxin-producers." This quality was always associated with the formation of a pellicle on the surface of the broth culture. Toxic filtrates prepared from 3 strains were dispensed, without preservative, into ampuls, which were sealed and stored at 3 to 5° C.

These toxins were titrated by intracisternal injection into guinea pigs. A standard fatal dose was taken as the least amount of the

toxin that would regularly kill, within 48 hours, 3 out of 4 guinea pigs weighing 200 to 250 grams. Not all of the filtrates could be titrated satisfactorily, but some gave very consistent results. Toxic filtrates 479A and 198A were chosen for the following experiments, and with both of these toxins, 0.2 cc of 1:2 dilution was taken as the standard dose.

The serum included in this study with toxins comprised 2 polyvalent horse antitoxins, 6 monovalent rabbit antitoxins, 13 polyvalent antimeningococcic serums (horse), 3 normal horse serums, and 3 normal rabbit serums. It was at this point in our studies that we began to realize that many horse serums were, in themselves, toxic for guinea pigs and rabbits when given by this route. Hence, each serum used was tested for toxicity by giving it alone to a series of 4 guinea pigs.

In the first three experiments the serums under study were added to the toxin, and the mixture was injected intracisternally, the volume injected being 0.2 or 0.3 cc, depending on the amount of serum used. In three experiments, 5 serums (1 antitoxin, 3 polyvalent antimeningococcic serums, and a normal horse serum) were tested for protection against toxin 198A when the toxin-antitoxin mixture was injected intracisternally. These 5 serums had been found to be practically nontoxic in themselves; and it was felt that any protective action which they possessed would, therefore, be evident in these experiments. In the first 2 of the 3 experiments, there was no evidence of protection. The two serums used in the third experiment had been concentrated, and there was apparently some protection in two groups of guinea pigs receiving mixtures of these serums with the toxin, though such results were obtained inconstantly.

As in the experiments with living cultures, the lack of evidence of definite protection by immune serums when given intracisternally led us to try other routes of administration. The toxin was given intracisternally, as before, and the serum injected intraperitoneally. No serum seemed to be of any value, whether the amount given was 1 cc or 4 cc.

These studies were followed by others in which the serums were given intravenously. The serum was given by this route immediately after the intracisternal injection of the toxin. Table 1 shows the results obtained in 3 experiments done several days apart with the same toxin and antitoxin. These experiments illustrate well how inconstant any protection offered seemed to be. The results in experiment 2 are almost dramatic, but experiments 1 and 3, done with the same material, show much less favorable results. However, in all three experiments the mortality among the guinea pigs receiving antitoxin intravenously was somewhat less than that among animals given the usual antimeningococcic serums by this route. This advantage for the antitoxic serums over the antibacterial is suggested again with

antitoxins AR7 and AR5 (both made in rabbits) in the experiments summarized in table 2, in which 9 polyvalent antimeningococcic serums (3 of them concentrated) and 4 antitoxins were tested simultaneously. The rabbit antitoxins were monovalent, and were specific for the toxin used in these experiments.

TABLE 1.—*Three experiments in which the same antitoxin was given intravenously to guinea pigs which had received the same toxin intracisternally*

Experiment no.	Number of animals	Amount of toxin 198A, 1-2	Amount of serum AH2	Effect	
				Died	Survived
		cc	cc		
I	4	0.2	1	1	3
	4	.2	2	2	2
	4	.2		3	1
II	4	.2	.5	1	3
	4	2	1	1	3
	4	2	2	0	4
	4	.2	4	0	4
	4	.2		4	0
III	4	2	.5	3	1
	4	.2	1	1	3
	4	2	2	3	1
	4	.2	4	1	3
	4	2		3	1

TABLE 2.—*The effect of polyvalent antibacterial serums and antitoxins when given intravenously to guinea pigs which had received toxin intracisternally*

[Date Aug 13, 1933]

Number of animals	Amount of toxin 198A	Serum intravenously	Amount	Effect	
				Died	Survived
	cc		cc		
4	0 2			3	1
4	.2	BH16	1	3	1
4	2	BH16	2	2	2
4	2	BH17	2	2	2
4	2	BH18	2	1	3
4	.2	BH19	2	3	1
4	.2	AH2	2	2	2
4	.2	AR7	2	1	3
4	.2	AR5	2	0	4
4	.2	BH20	2	3	1
4	.2	BH21	2	2	2
4	2	BH22	2	4	0
4	.2	BH23	2	3	1
4	.2	BH24	2	2	2
4	.2	AH4	2	3	1

In our studies, rabbits and guinea pigs, and also mice, were found to be highly resistant to the meningococcus toxic filtrates when they were given intravenously, some of the rabbits being able to receive as much as 6 cc by this route without ill effect, though others succumbed to smaller amounts. The toxin seemed to be chiefly neurotropic in its action. Thus, studies on intravenous injection of toxins and toxin-antitoxin or toxin-serum mixtures could not be made satisfactorily.

A word should be added about the stability of the toxins used in these studies. Storage temperature was 3° to 5° C. At first all ampuls of any given lot seemed to be exactly alike, and the standard dose remained constant. After a year had elapsed it was noticed that individual ampuls varied in strength. Titrations were made at frequent intervals, and a control group of animals, receiving toxin only, was included, as usual, with each experiment. Some of the lots of toxin are now more than 5 years old, and at least one-half of the ampuls recently tested seem to be as toxic as they were when first made, though others have become very weak.

These studies made with toxin in guinea pigs do not indicate that dependable and regular protection is afforded by any of the serums studied when given by any of the routes used.

III. BACTERIOLOGICAL STUDIES

Most of the animals that died were autopsied and cultures on blood agar were made from the surface of the brain and from the heart blood. Among those animals that were given living cultures, meningococci were recovered more regularly from guinea pigs than from rabbits, though they were obtained occasionally from rabbits also. In some guinea pigs, meningococci were obtained from the heart as well as from the brain, but more commonly they were found only in those cultures made from the brain. They were never obtained from the heart of any rabbit. Meningococci were recovered as often from those animals that received serum as from those that did not, but more often when the serum was given intravenously or intraperitoneally than when it was given intracisternally. Meningococci were recovered from about one-fourth of all of the animals given serum intravenously and from about one-sixth of those given serum intracisternally.

Cultures were also made from the dead animals given only toxin or serum intracisternally in order to be sure that they did not die of some intercurrent infection. As a rule, cultures from animals dying within 48 hours after injection were negative for all bacteria, whereas those from animals that succumbed after a longer period of time were more likely to show the presence of secondary invaders. By far the most common of these was a small Gram-negative rod of the genus *Pasteurella* and a large Gram-positive coccus. These were infrequent.

DISCUSSION

Acute purulent meningitis can be produced in rabbits and guinea pigs by the intracisternal injection of cultures of meningococci which are sufficiently virulent. Meningitis which is essentially identical

both clinically and histopathologically is produced by similar injections of Berkefeld filtrates of 4–6-day broth cultures of some strains of meningococci. In the hands of the authors these toxin-producing strains have always proved to be of serological group I–III.

Attempts to protect rabbits and guinea pigs against meningitis, whether due to living cultures or to toxins, by means of serums, have not met with success. Twenty-four polyvalent antimeningococcic serums (horse) from 8 sources, 4 polyvalent antitoxins (horse), 13 monovalent antitoxins (rabbit), and a number of normal serums, including horse, rabbit, and guinea-pig, have been given to animals which had received toxin or living cultures. The toxins and cultures were given intracisternally, whereas the serums were given intracisternally, intraperitoneally, intravenously, or by a combination of routes.

Slightly better results were obtained with the antitoxins than with the usual unconcentrated antimeningococcic serums, but the difference was not great enough to be of definite significance, and the apparent protection was inconstant. There is some evidence that concentrated serums may offer some protection. The amount of serum that can be given intracisternally without causing pressure symptoms is very small. Many horse serums are toxic in themselves when given to rabbits and guinea pigs by this route.

When living cultures are given intracisternally, the infection usually remains fairly well localized in the meninges; invasion of the blood stream does occur not infrequently in guinea pigs, but has not been observed by us in rabbits. To what extent the toxin becomes disseminated throughout the body when given intracisternally is not known, but relatively large amounts of it seem well tolerated by rabbits and guinea pigs when it is given intravenously. There is no evidence that the relatively large amounts of serum given intravenously have come in contact with the inflamed meninges. Thus, it seems that the meningitis experimentally produced in rabbits and guinea pigs by the meningococcus or its toxic products does not offer a satisfactory basis for the study of the comparative therapeutic value of serums, whether antibacterial or antitoxic, by the methods which we have used. In this respect, our results are at variance with those of Zdrodowski and his coworkers (*6*).

CONCLUSIONS

Experimental meningitis in rabbits and guinea pigs has not provided a basis for the study of the therapeutic value of the antimeningococcic serums or meningococcus antitoxins included in our studies.

Meningitis was easily produced in these animals, but they were

not protected to any appreciable degree by the serums when they were administered intracisternally, intraperitoneally, or intravenously.

Some of the experiments have suggested that with more perfect methods of concentrating the serums, better protection may be obtained.

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Addendum

The experiments described in the two foregoing papers were done several years ago before the discovery, by Nungester and Miller, of the mucin technique for enhancing the virulence of meningococci.

Since the completion of our work, reports on experimental meningitis in rabbits or guinea pigs have been made by Maegraith, Ferry, Monteiro, Zdrowdowski and Golinewitch, Pawlow, Puschnowa and Cryjanowskaja, and Petrie. The conflicting results obtained by some of these workers may possibly, in the light of our foregoing papers, be partially explained.—*S. E. Branham.*

PLANS OF THE CHILEAN GOVERNMENT FOR IMPROVING THE NUTRITION OF THE PEOPLE[1]

By Eduardo Cruz Coke, M. D., *Minister of Health, Social Security, and Welfare of Chile*

From the researches of a study mission of the Health Committee of the League of Nations,[2] from studies made in Chile by Drs. Arturo Mardones, Luis Calvo Mackenna, Carlos Garcés, Ramón González, Julio Santa María, Luis Toro Genkel, Jorge Mardones Restat, and my own investigations, the following deficiencies are seen to be characteristic of Chilean nutrition:

(1) Malnutrition of an important part of the infant population, with its effects on physical development; (2) insufficient production in Chile of foods which the Health Committee of the League of Nations considers protective (milk and its derivatives, meat, eggs, green vegetables, and fruits); (3) phosphorus and calcium deficiency in foods produced in some parts of the country, especially phosphorus; (4)

[1] From an address to the National Council on Nutrition, Chile, Feb. 18, 1937. Translated from the *Boletín de la Oficina Sanitaria Panamericana*, July 1937

[2] Studies made in 1935–36 at the request of the Chilean Government. Results as yet unpublished.

lack of meat and proteins in the diet of an important part of the population; (5) little variety in the habitual diet.

The Chilean people obtain their food fundamentally from wheat and potatoes, in an unvaried diet. The consequences of the deficiencies noted are seen in the poor development of the children, with its evident dangers for the future of the race. Therefore the Ministry of Health is centering its attention on the child, whose height, development, and health depend principally on its nutrition, as was shown by the studies of Dr. Jorge Mardones Restat and collaborators, who analyzed the relationship between these characteristics and the social conditions of a group of children in the primary schools of Santiago.

Before describing a tentative plan of action, it would be well to mention the agencies of the State which may be utilized in any measures affecting production and consumption.

The Government has three important departments regulating production: The Farm Credit Board, the Agricultural Exports Board, and the Farm Settlement Board. In addition, it acts through other public departments in encouraging the fishing industry, and in bringing meat from Magallanes [3] to the market centers of the Central Region.

The Government may also act on consumption through the Central Subsistence Bureau and the warehouses of the Department of Social Security to influence the prices of foods. It may educate the public on proper nutrition through the various branches of the public school system, as well as through the Army and Navy and the Department of Nutrition of the National Department of Health. All these organizations have, until now, acted independently, without the coordination which would have permitted regulating production in accordance with consumption. The coordination of these bodies has now been entrusted to the National Council on Nutrition, made up of experts representing both producers and consumers.

The Farm Credit Board should direct its activities toward the making of loans at low interest rates to those agricultural enterprises which the Government, as represented by this Council, may consider, at any given moment, of most importance in relation to the national food supply.

The Agricultural Exports Board, without abandoning its function of stimulating the exportation of farm products, should fix the export quotas in proportion to the necessities of the moment, as suggested by this Council. It must be considered as a fundamental principle that the primary function of our national agriculture is to produce the necessary foods for consumption by our population, and only secondarily to export the surplus. Intensive development of our

[3] Magallanes is a remote province at the southernmost end of Chile and is the center of the cattle industry.

farm territory will permit the fulfillment of both functions. This principle does not imply that there should not be produced a certain amount to be exported advantageously with respect to the world market, but in such a case there must be worked out some means to supply the nutrients which, by reason of this exportation, are lacking.

The Farm Settlement Board shall, through the gradual division of land ownership, secure a spontaneous change from extensive to intensive development of land, obtaining thus an increase in the yield. Its supervised colonies and its recommendations to landholders should constitute factors of prime importance in the orientation of agricultural production in accordance with the necessities of the country.

But production is linked not alone with this type of activity. Food does nothing more than transport from the earth to man specific materials. No aliment contains what the earth does not give it. The latest statistics show that the average yield of agricultural production tends to diminish, and that the level of production is being maintained only by the extension of cultivated territory. This is the consequence of the impoverishing of that which a country should care for above all—the soil from which it is nourished. The indolence of many farmers who do not return to their fields by adequate fertilizing what they take from them may be considered as a potential, if not immediate, peril. There is needed, then, a policy of distribution of fertilizer which will result in an increased farm yield and in a better quality of vegetable foods produced.

With regard to the stimulation of the consumption of protective foods, the Central Subsistence Bureau and the Department of Social Security, through their warehouses, should cause the burden of costs to fall on the least useful foods, in order to permit a minimum price for those the consumption of which it is most necessary to stimulate. The determination of the degree of utility of an aliment in relation to its physiological value and the state of the national production shall be undertaken by this Council, which shall guide both departments in this regard.

The collaboration of the various branches of the educational system is of first importance. It is no exaggeration to say that the progress of a country is most greatly influenced by a system which teaches the child first to live correctly—eat, live, dress, and work correctly—rather than to read rapidly. Practical teaching of correct nutrition may be accomplished in part in the primary school through the school lunch, prepared in accordance with the recommendations of this Council. In boarding schools, barracks, and on ships a similar result will be obtained by rational nutrition, developing habits likely to be followed when the individual leaves these places.

The expending of funds which the state or municipality contributes to the upkeep of children's institutions should be in accordance with standards fixed by this Council.

About 50 percent of the population of Chile lives in rural districts. Contrary to what might be thought, an important proportion of this group, especially the children, is very badly nourished, to such a point that a great deal of our tuberculosis finds its focus in the rural population, and, likewise, other conditions develop when the organic defenses are weakened. There are, then, urgently needed measures which will assure to this population the minimum necessary, not for mere existence, but to secure the most modest standards of bodily development.

To this end, this Ministry has already contacted numerous farmers, and wishes, through this Council and the agricultural societies, to bring to the attention of the farmer the standards to which his public duty requires him to adhere, with regard both to his tenants' welfare and to seeing that his farm contributes its part toward the public need.

For this there has been undertaken the creation of an Association of Farm Proprietors, under the sponsorship of the Ministry of Health and of this Council, to see that the family of the tenant has available the proper bases for nutrition and uses them in the manner most suitable to life and health.

The primary necessities which must be taken care of, for the future of our people, may be summarized in two points: It is necessary that each child of the tenant have a half liter of milk daily, up to the age of 8 years, and a half kilo of meat or legumes weekly to the age of 15 years; and each nursing mother must have 1 liter of milk per day.

The Government does not deem it expedient to go more deeply into the particular economy of agricultural development at this moment, and has set up these standards with the idea that the administrator shall be responsible for this minimum program, compatible with the poorest agricultural returns, there being no excuse for failure to comply with this plan. The moral promise contracted by the administrator, within the organization established, will be supervised by the members of the association, and, on the part of the Ministry, by social workers or whoever may replace them. Each patron or administrator will know what means to take to solve the problem within his capacities. No one shall be asked to do the impossible, but all necessary influence will be exercised to see that no one fails to do what he is in a position to accomplish. The Government will request this cooperation from agriculture and is sure of receiving it. A refusal to cooperate would justify a similar refusal by the Government to furnish the aid which is being constantly requested of it.

The difficulties and objections which a few have raised against a system such as this, entailing no direct penalties, are not valid except

to those who are unaware that there do exist in this country moral values and a desire to serve in a much greater proportion and intensity than superficial examination reveals. The experience obtained in the province of O'Higgins shows that intelligent competition, timely propaganda, and social pressure can in many cases accomplish more than laws carrying heavy penalties. I do not believe that the Farm Proprietors Association to which I refer will fail to secure the fulfillment of the minimum requirements of 500 grams of milk daily and 500 grams of meat or legumes weekly, especially since this is no vague promise to contribute to an ill-defined measure of well-being, but a precise obligation expressed in weights and measures.

The most serious problem confronting the Ministry of Health in the solution of the nutritional problems requiring immediate consideration is the gradual decrease in the production of milk, since our country already produces it in a quantity very much below its minimum necessities (from one-fifth to one-tenth as much per inhabitant in relation to the European, American, and Australian production—Switzerland, 600 liters per inhabitant per year; France, England, and Germany, 300–400; Chile, 40). If it is remembered that milk is the principal material for the building of a race, irreplaceable by any other food in nearly all cases, that it is the most important of the protective foods, and that according to our own studies and those of our coworkers it has, furthermore, an inhibitory action on precocious sexual development, the primary interest of the Department of Public Health in its maximum consumption will be understood.

All attempts at decreasing infant mortality are useless if the child and the nursing mother do not have sufficient milk, and all moral education of children becomes purposeless if through lack of milk puberty is advanced and, with this, precocious differentiations resulting in an organic and psychological unbalance.

The Government has already suggested measures to stimulate consumption and production of milk, which the Council will carry on; these include the school lunch, the contribution being almost entirely in milk, and perfecting of the relations between production and distribution, involving pasteurization plants.

Investigation of the causes of decreased production of milk has shown that it is due to the fact that the economic return from milk production has not increased in proportion to that from other farm products which, furthermore, are easier to produce and do not necessitate control and regulation. Means are being studied of increasing production not only through increased consumption, the state itself being a large purchaser for the school lunch, but also through lending at low interest the extra capital needed by the milk industry. The installation of milk drying or condensing plants in the grazing regions

of the South, permitting utilization of it in periods of great abundance, is another measure which may be established.

On the initiative of the Ministry of the Treasury, the Government has resolved on the use, in part, of meat from Magallanes, and is considering the establishment of a refrigerating system in the principal ports and centers of consumption which will also serve as a solution of the problem of preserving fish, permitting larger exploitation of the fishing industry, and of the preservation of fruit for exportation. This year there will be brought in from 2,500 to 3,000 tons of frozen meat at a price within the reach of modest salaries, a quantity representing the minimum capacity of the existing refrigerating plants. The Government is also disposed to use in increasing the supply of meat a system formerly used with success—that of loans to the raisers of small stock (sheep and hogs) in other sections of the country.

The deficiency in phosphorus, producing dental caries, bone deformities, growth disturbances, and so on could be solved over a number of years by means of phosphate fertilizers. The Ministry of Health has decided that the most simple and practical manner of solving this important problem immediately is by adding to common salt a quantity of phosphorus determined as immediately assimilable, and the corresponding law has been issued, so that the people of Chile will receive, through salt in their food, about 0.50 grains of assimilable phosphates.[4]

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[4] Text of the law on phosphorus, Santiago, Feb. 23, 1937:

Whereas after various studies the conclusion has been reached that among the principal deficiencies in our nutrition is the small concentration of mineral salts, that this deficiency results in the frequency of dental caries and bony disturbances in growth; that it is urgently necessary to arrest this poverty which results in an increase in morbidity and a lowered resistance of our population, which does not have access to a diet compensating these deficiencies; that among the most important of these materials as regards the lack of it and its value is phosphorus; that the most practical, economical, and rapid manner of securing to all the inhabitants of the country a supply of this substance in quantities which will make up for the deficit is to add it to a basic food element of wide and varied application; that common salt (kitchen salt, table salt) combines all these characteristics. By virtue of the authority vested in me by article 166 of the Sanitary Code in force,

I hereby decree that—

1. Salt for food purposes shall contain the quantity of 4 percent of acid sodium phosphate.

2. Salt plants, establishments, or factories engaged in the crystallization, extraction, or preparation of common salt, and the retailers of it, may not distribute salt for food purposes if it does not contain, in the indicated proportion, the product named in the previous article.

3. The enforcement of this Decree is in charge of the National Department of Health.

4. Any actual or legal person failing to comply with the regulations set up in the articles 1, 2, and 5 of this Decree shall be punished with a fine of from 50 to 1,000 pesos, and in addition the merchandise which does not comply with the requirements here established may be confiscated. The same penalties shall apply to anyone who, in the preparation of food products, uses salt which fails to comply with the provisions of Article 1 of this Decree.

5. Salt used exclusively for industrial purposes, such as that used in refrigerating plants, freezers, soda factories, and for salting hides and tripe, where food products are not produced, or which is not used in food products, is exempt from the above provisions.

To be exempt, producers or sellers of common salt shall require, and industries shall secure from the National Department of Health, special purchase permits, stating in the application the salt factory or establishment where the salt is to be purchased, declaring that it will not be used for food purposes, indicating the quantity purchased, and obligating themselves not to resell the salt, even in part, without the necessary permission.

6. This Decree shall be in force 120 days after its publication in the Diario Oficial.

(Signed) ALESSANDRI E. CRUZ COKE.

The stimulation of the division of farm lands will permit a greater production of green vegetables and fruits (protective foods), as already observed in Chile wherever the Farm Settlement Board had available the economic possibilities of accomplishing it. This development will be intensified, and the Council will advise as to the type of production to be required by the Department.

The problem of fertilizer distribution may be solved, in part, after further study, by requiring for the exportation of all foods involving a considerable extraction from the soil of nitrogen, phosphorus, and calcium, a certificate showing that the farmer has returned to his soil, by adequate fertilization, the elements which the exportable crop has extracted. This will, over a period of time, benefit the farmer himself, since he will not only obtain a larger immediate yield, but his land will not become impoverished.

The high consumption of wheat is an indication of the lack of other foods of better quality such as those of animal origin and the legumes. Measures to stimulate the consumption and production of beans are justified by the consideration that the bean crop has decreased from a million quintales in 1933, with a consumption of 800,000, to 700,000 in 1936 with a consumption of 469,000.[5]

The Ministry of Labor, by influencing prices or salaries through the Central Subsistence Bureau will try to see that the prices of foods are at a level at which they may be obtained by persons in the low-wage group in sufficient quantity for normal sustenance; the Ministry of Agriculture is revising its loan and export policies in accordance with the plans outlined above.

The Government, speaking through the Ministry of Health, believes that it has demonstrated with shocking frankness the precarious state of national nutrition; and having completed studies of the problem, it has begun to adopt all the measures within its power to bring about not only an immediate solution where possible, but also to establish the bases of a true policy of nutrition which shall embrace all pertinent departments of the State. The Government has tried to harm as few interests as possible, but considers the health of the people of first importance.

This Ministry has not referred, except in passing, to a problem undoubtedly linked with that of nutrition—that of wages, a problem which another department of the State is attempting to solve in accordance with the minimum needs of the people.

With regard to the Council on Nutrition, its influence and possibilities for accomplishment depend not on the powers given it but on the zeal which its members display for the public welfare. The

[5] A quintal is approximately 100 pounds.

country possesses enormous resources unknown to the outsider. The Government realizes this, and it is with great hopes that the work of this Council is begun.

ADDING SODIUM ACID PHOSPHATE TO TABLE SALT TO CORRECT PHOSPHORUS DEFICIENCY

With reference to the addition of acid sodium phosphate to table salt for the purpose of correcting a dietary deficiency of phosphorus, Dr. W. H. Sebrell, of the United States Public Health Service, doubts the efficacy of such a measure as that provided in the decree quoted in the preceding article, in which it is required that all salt used for food purposes shall contain 4 percent of acid sodium phosphate. The following is an excerpt from a memorandum on the subject recently prepared by Dr. Sebrell:

Sollman states that the phosphate ion is poorly absorbed. The absorption depends, partly at least, upon the amount of calcium and vitamin D present. However, disregarding such important considerations as the utilization of phosphorus furnished in this manner, and the advisability of increasing dietary phosphorus without increasing dietary calcium proportionately, the practical futility of attempting to make a diet adequate in phosphorus by adding sodium acid phosphate to table salt can be shown by a little simple arithmetic.

The average daily consumption of sodium chloride by adults has been variously estimated at from 10 to 20 grams per day. The average daily requirement is estimated at about 2 grams per day. From the available estimates of the amount of sodium acid phosphate proposed to be imported into Chile annually, it would appear that the Chilean consumption of sodium chloride is well within this range and possibly near the lower figure. However, we may base our calculations on the highly improbable maximum average daily intake of 20 grams of sodium chloride:

1 gram of NaH_2PO_4 (sodium acid phosphate) contains 0.224 gram of phosphorus.

If a 4-percent mixture is made with sodium chloride, every gram of the sodium chloride-sodium acid phosphate mixture contains 0.00896 gram of phosphorus.

On the basis of an average daily intake of 20 grams of the sodium chloride mixture, the average daily intake of phosphorus would be only 0.1792 gram.

Since an adult needs 0.88 gram of phosphorus daily for maintenance (Sherman), and the recommended intake per day per adult is 1.32 grams, and the fact that the requirement for children and pregnant and lactating women is even higher than this, it is obvious that the addition of a variable amount of phosphorus, which in all probability will not equal 0.1792 gram per adult per day and will more than likely be in the neighborhood of half of this figure and even less for children, will not be sufficient to correct any material deficiency in phosphorus existing in the population.

DEATHS DURING WEEK ENDED JULY 31, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended July 31, 1937	Corresponding week, 1936
Data from 86 large cities in the United States:		
Total deaths	7,248	7,095
Average for 3 prior years	7,988	
Total deaths, first 30 weeks of year	272,717	273,970
Deaths under 1 year of age	489	497
Average for 3 prior years	537	
Deaths under 1 year of age, first 30 weeks of year	17,229	17,148
Data from industrial insurance companies:		
Policies in force	70,091,298	68,393,465
Number of death claims	13,217	14,038
Death claims per 1,000 policies in force, annual rate	9.8	10.7
Death claims per 1,000 policies, first 30 weeks of year, annual rate	10.4	10.4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 7, 1937, and Aug. 8, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug 7, 1937	Week ended Aug 8, 1936	Week ended Aug 7, 1937	Week ended Aug 8, 1936	Week ended Aug 7, 1937	Week ended Aug 8, 1936	Week ended Aug. 7, 1937	Week ended Aug. 8, 1936
New England States:								
Maine		5				33	0	0
New Hampshire		1			8	2	0	0
Vermont		1					0	0
Massachusetts	6	7			36	89	3	0
Rhode Island					1	1	0	0
Connecticut [4]	8	1		1	18	16	0	3
Middle Atlantic States:								
New York	20	17	[1] 3	[1] 2	151	223	9	11
New Jersey	2	1		6	73	50	0	1
Pennsylvania	17	13			257	73	10	5
East North Central States:								
Ohio	6	7	1	3	77	17	3	1
Indiana	2	8		4	33	1	2	3
Illinois	15	17	1	6	80	3	7	3
Michigan	7	4			68	8	1	2
Wisconsin	3	4	28	7	38	61	1	0
West North Central States:								
Minnesota	5	1	1	1	4	3	0	0
Iowa	2	3	1	2	6	3	0	4
Missouri	7	5	25	27	1		1	0
North Dakota	3	1	2				0	0
South Dakota		1				2	1	0
Nebraska		6			2	8	0	0
Kansas	1	6		1	7		1	0
South Atlantic States:								
Delaware						1	0	0
Maryland [3]	4	8		2	13	30	0	2
District of Columbia	3	1			3	7	2	0
Virginia [3] [4]	17	10			13	14	1	6
West Virginia	3	3	14		24	3	0	2
North Carolina	8	18		4	32	5	3	1
South Carolina [4]	8	1	42	32	34	5	0	0
Georgia [4]	17	8					3	2
Florida [4]	2	6		1	8		0	2
East South Central States:								
Kentucky	3	2	1		21	14	4	13
Tennessee [3] [4]	7	8	8	13	7	5	1	2
Alabama [4]	11	9	5	11	1	1	3	0
Mississippi [3] [4]	9	10					0	0
West South Central States:								
Arkansas	5	3	4	1	2		0	0
Louisiana [4]	9	5	10	6	2	5	1	0
Oklahoma [3]	5	4	1	11	6	1	2	0
Texas [4]	31	24	53	26	36	33	5	1
Mountain States:								
Montana [3]	1	1			3	1	0	2
Idaho			3		4	4	1	0
Wyoming	1	1			2	1	0	0
Colorado [3]	6	2			12	2	0	1
New Mexico	5	1		1	21	1	0	0
Arizona		3	11	7	1	28	0	0
Utah [3]					4	4	0	0
Pacific States:								
Washington	1				16	20	0	0
Oregon	1		8	4	7	6	0	1
California	21	17	7	8	21	67	2	2
Total	282	254	229	187	1,153	851	67	70
First 31 weeks of year	13,093	14,096	274,029	139,684	239,154	266,228	4,058	5,772

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 7, 1937, and Aug. 8, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 7, 1937	Week ended Aug. 8, 1936	Week ended Aug. 7, 1937	Week ended Aug. 8, 1936	Week ended Aug. 7, 1937	Week ended Aug. 8, 1936	Week ended Aug. 7, 1937	Week ended Aug. 8, 1936
New England States:								
Maine	13	0	2	4	0	0	0	1
New Hampshire	0	0	1	1	0	0	0	1
Vermont	0	1			0	0	0	0
Massachusetts	12	2	38	46	0	0	1	4
Rhode Island	1	0	2	5	0	0	0	2
Connecticut [4]	3	1	13	8	0	0	2	1
Middle Atlantic States:								
New York	17	8	71	111	0	0	18	13
New Jersey	3	0	12	14	0	0	7	4
Pennsylvania	11	3	126	111	0	0	25	22
East North Central States:								
Ohio	38	4	35	42	0	0	28	4
Indiana	7	1	24	23	2	0	6	7
Illinois	28	11	91	111	0	1	19	19
Michigan	14	3	89	76	0	0	5	6
Wisconsin	6	0	48	78	1	3	3	2
West North Central States:								
Minnesota	9	0	25	22	2	1	3	1
Iowa	4	1	26	27	3	1	4	3
Missouri	16	3	15	15	0	1	14	26
North Dakota	0	0	5	8	3	0	2	0
South Dakota	1	0	5	20	6	0	1	0
Nebraska	7	0	2	8	1	0	1	0
Kansas	13	0	23	31	1	1	15	4
South Atlantic States:								
Delaware	0	0	8	2	0	0	5	1
Maryland [2]	3	1	5	10	0	0	14	8
District of Columbia	0	0	3	1	0	0	2	1
Virginia [3 4]	4	2	8	15	0	0	57	35
West Virginia	12	2	18	9	0	0	15	11
North Carolina	4	2	25	13	0	0	25	45
South Carolina [4]	1	2	11		0	0	12	18
Georgia [4]	6	6	7	5	0	0	36	25
Florida [4]	0	0	2	2	0	0	4	3
East South Central States:								
Kentucky	9	4	20	7	0	1	43	42
Tennessee [3 4]	3	26	8	3	1	0	43	40
Alabama [4]	3	26	11	8	0	0	19	36
Mississippi [2 4]	8	12	4	5	0	0	16	17
West South Central States:								
Arkansas	21	0	3	5	0	0	37	15
Louisiana [4]	7	1	5	17	0	0	23	39
Oklahoma [5]	[6] 30	0	7	10	0	0	23	49
Texas [4]	58	0	31	17	0	1	113	87
Mountain States:								
Montana [3]	2	0	7	3	9	8	3	2
Idaho	0	1	6	7	6	1	0	1
Wyoming	2	0	5	9	0	2	2	0
Colorado [3]	2	0	12	11	0	0	0	2
New Mexico	0	0		5	0	0	2	7
Arizona	0	0		1	0	0	1	4
Utah [2]	0	0	4	4	0	3	1	1
Pacific States:								
Washington	1	5	19	18	5	0	11	3
Oregon	2	1	9	7	2	0	8	5
California	33	9	50	61	10	1	18	17
Total	414	138	939	1,016	52	25	687	634
First 31 weeks of year	2,485	1,174	163,175	176,932	7,847	5,863	6,813	6,146

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended Aug. 7, 1937, 9 cases, as follows: Virginia, 5; Tennessee, 2; Montana, 1; Colorado, 1.
[4] Typhus fever, week ended Aug. 7, 1937, 101 cases, as follows: Connecticut, 1; Virginia, 1; South Carolina, 1; Georgia, 62; Florida, 6, Tennessee, 1; Alabama, 13; Mississippi, 1, Louisiana, 2; Texas, 13.
[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa.
[6] Delayed report of 10 cases included.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
March 1937										
Tennessee	33	37	1,539	10	86	13	1	85	0	9
July 1937										
Delaware					6	1	1	3	0	3
District of Columbia		29			109	2	1	14	0	17
Idaho	2	1	18		36		1	52	35	3
Iowa	7	15	2	5	38		7	117	111	14
Nebraska	3	5			33		20	40		4
Vermont		4			17		2	8	0	0

March 1937

	Cases
Tennessee:	
Chicken pox	232
Dysentery (amoebic)	3
Dysentery (bacillary)	2
German measles	101
Mumps	180
Ophthalmia neonatorum	4
Paratyphoid fever	1
Puerperal septicemia	1
Septic sore throat	5
Tetanus	1
Trachoma	12
Tularaemia	4
Vincent's infection	13
Whooping cough	158

July 1937

	Cases
Chicken pox:	
Delaware	5
District of Columbia	18
Idaho	16
Iowa	57
Nebraska	15
Vermont	32
Conjunctivitis:	
Idaho	1
Dysentery (bacillary):	
District of Columbia	1
Encephalitis, epidemic or lethargic:	
District of Columbia	1
Idaho	1
German measles:	
Delaware	1
Idaho	4
Iowa	4
Impetigo contagiosa:	
Idaho	1
Mumps:	
Delaware	6
Idaho	46
Nebraska	15
Vermont	149
Ophthalmia neonatorum:	
Idaho	1
Rocky Mountain spotted fever:	
Delaware	1
District of Columbia	1
Idaho	5
Iowa	3
Septic sore throat:	
Idaho	8
Nebraska	1
Vermont	1
Trachoma:	
Idaho	8
Iowa	7
Tularaemia:	
Idaho	1
Undulant fever:	
Iowa	11
Vermont	5
Whooping cough:	
Delaware	77
District of Columbia	46
Idaho	55
Iowa	152
Nebraska	65
Vermont	79

PLAGUE IN GROUND SQUIRREL, BEAVERHEAD COUNTY, MONT., AND IN FLEAS FROM CHIPMUNKS, ORMSBY COUNTY, NEV.

Under date of August 3, 1937, plague was reported demonstrated in tissue from a ground squirrel (*Citellus elegans*) shot 3 miles south of Dillon, Beaverhead County, Mont. On August 4, 1937, plague infection was stated proved in a lot of 86 fleas taken from 52 chipmunks (*Eutamias frater*) shot 12 miles west of Carson City, Ormsby County, Nev.

WEEKLY REPORTS FROM CITIES

City reports for week ended July 31, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	123	40	13	745	301	349	6	380	95	1,328	......
Current week [1]	85	21	6	671	285	283	7	340	65	1,401	......
Maine:											
Portland	0	......	0	1	1	0	0	0	0	3	17
New Hampshire:											
Concord	......	......	......	......	......	......	......	......	......	......	......
Manchester	0	......	0	......	2	0	0	0	0	0	17
Nashua	0	......	0	2	0	0	0	0	0	0	3
Vermont:											
Barre	0	......	0	1	0	0	0	0	0	0	8
Burlington	0	......	0	0	0	0	0	0	0	0	11
Rutland	0	......	0	0	1	0	0	0	0	0	8
Massachusetts:											
Boston	2	......	0	3	6	11	0	8	0	34	179
Fall River	1	......	0	1	1	1	0	0	0	3	20
Springfield	0	......	1	0	1	2	0	0	1	6	36
Worcester	0	......	0	2	5	1	0	2	1	5	......
Rhode Island:											
Pawtucket	0	......	0	0	0	0	0	0	0	0	11
Providence	0	......	0	6	3	2	0	1	0	18	55
Connecticut:											
Bridgeport	0	......	0	0	0	1	0	3	0	0	20
Hartford	0	......	0	6	1	0	0	3	0	4	31
New Haven	0	......	0	6	0	1	0	1	0	2	32
New York:											
Buffalo	0	......	0	7	7	0	0	4	0	37	131
New York	30	4	2	127	51	27	0	69	6	91	1,151
Rochester	0	......	0	2	1	1	0	0	0	13	50
Syracuse	0	......	0	10	1	0	0	1	0	0	31
New Jersey:											
Camden	0	......	0	2	0	1	0	1	1	4	24
Newark	0	......	0	5	0	1	0	4	0	29	81
Trenton	0	......	1	9	7	0	0	4	0	4	33
Pennsylvania:											
Philadelphia	0	......	0	0	5	12	0	21	6	64	387
Pittsburgh	1	1	0	43	14	7	0	9	0	62	148
Reading	0	......	0	4	0	1	0	1	0	0	18
Scranton	0	......	......	0	......	0	0	......	0	2	......
Ohio:											
Cincinnati	1	......	0	11	4	3	0	7	2	32	132
Cleveland	1	2	0	62	8	11	0	10	1	57	168
Columbus	0	......	0	26	1	4	0	3	0	37	88
Toledo	0	......	0	16	1	1	0	6	2	34	66
Indiana:											
Anderson	0	......	0	5	2	0	0	0	0	4	10
Fort Wayne	0	......	0	0	0	1	0	0	0	0	25
Indianapolis	2	......	0	5	6	1	1	5	1	26	90
Muncie	2	......	0	0	0	0	0	2	0	0	14
South Bend	0	......	0	2	0	0	0	0	0	0	11
Terre Haute	0	......	0	0	0	1	0	0	0	0	22
Illinois:											
Alton	0	......	0	1	0	2	0	0	1	0	5
Chicago	11	......	1	125	21	42	0	35	5	83	587
Elgin	0	......	0	0	1	0	0	1	0	1	13
Moline	0	......	0	0	0	1	0	0	0	9	6
Springfield	0	......	0	1	0	0	0	1	0	1	25
Michigan:											
Detroit	3	1	0	22	8	40	0	8	1	58	218
Flint	0	......	0	1	2	4	0	1	0	1	19
Grand Rapids	0	......	0	8	0	3	0	0	0	19	17
Wisconsin:											
Kenosha	0	......	0	0	0	1	0	0	0	0	8
Milwaukee	0	......	0	10	2	8	0	2	0	89	74
Racine	0	......	0	0	0	6	0	1	0	2	11
Superior	0	......	0	0	0	0	0	0	0	7	5

[1] Figures for Concord, N. H., St. Joseph and St. Louis, Mo., estimated; reports not received.

City reports for week ended July 31, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Minnesota:											
Duluth	0	------	0	0	1	3	0	1	0	1	20
Minneapolis	0	------	0	0	6	3	1	0	0	10	83
St. Paul	0	------	0	0	4	1	0	3	0	47	53
Iowa:											
Cedar Rapids	0	------	------	2	------	0	0	------	0	1	------
Davenport	0	------	------	0	------	0	1	------	0	0	------
Des Moines	0	------	0	0	1	5	0	0	1	0	29
Sioux City	0	------	------	0	------	1	0	------	0	5	------
Waterloo	0	------	------	0	------	2	0	------	0	1	------
Missouri:											
Kansas City	0	------	0	4	4	3	0	5	0	4	85
St. Joseph	------	------	------	------	------	------	------	------	------	------	------
St. Louis	------	------	------	------	------	------	------	------	------	------	------
North Dakota:											
Fargo	0	------	0	0	0	0	0	0	0	19	8
Grand Forks	0	------	------	0	------	1	0	------	0	5	------
Minot	0	------	0	1	0	0	0	0	0	0	5
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	4	------
Sioux Falls	0	------	0	0	0	0	0	0	0	0	8
Nebraska:											
Omaha	0	------	0	1	2	0	0	0	0	3	41
Kansas:											
Lawrence	0	------	0	1	0	0	0	0	0	11	3
Topeka	0	------	0	1	1	1	0	0	0	13	16
Wichita	1	------	0	2	4	2	0	0	0	14	27
Delaware:											
Wilmington	0	------	0	0	1	0	0	1	0	3	30
Maryland:											
Baltimore	6	------	0	5	11	5	0	9	0	123	197
Cumberland	0	------	0	0	0	1	0	0	0	18	14
Frederick	0	------	0	0	0	0	0	0	0	0	3
Dist. of Col.:											
Washington	1	------	0	6	8	6	0	9	6	9	136
Virginia:											
Lynchburg	0	------	0	1	3	0	0	0	1	7	18
Norfolk	0	------	0	0	1	1	0	2	0	0	16
Richmond	0	------	0	15	2	5	0	1	0	0	57
Roanoke	0	------	0	0	1	1	0	0	0	0	27
West Virginia:											
Charleston	0	------	0	0	0	0	0	1	1	0	15
Huntington	0	------	------	0	------	0	0	------	0	0	------
Wheeling	0	------	0	2	0	3	0	1	0	44	17
North Carolina:											
Gastonia	0	------	------	0	------	0	0	------	0	0	------
Raleigh	0	------	0	0	0	0	0	1	0	1	14
Wilmington	0	------	0	0	0	0	0	0	0	9	14
Winston-Salem	0	------	0	0	0	2	0	0	0	7	6
South Carolina:											
Charleston	0	7	0	0	3	0	0	0	1	0	29
Florence	0	------	------	0	------	0	0	------	0	0	13
Greenville	0	------	0	0	1	0	0	0	0	0	21
Georgia:											
Atlanta	1	------	1	0	0	5	0	4	2	18	76
Brunswick	0	------	0	0	0	0	0	0	0	0	4
Savannah	0	------	0	0	1	0	0	1	1	0	20
Florida:											
Miami	0	------	0	0	0	0	0	3	1	0	31
Tampa	0	1	0	1	0	0	0	2	0	1	19
Kentucky:											
Ashland	0	------	------	0	------	0	0	------	4	7	------
Covington	0	------	0	0	0	0	0	0	0	7	15
Lexington	0	------	0	0	1	0	0	1	0	10	23
Louisville	3	------	0	5	5	4	0	5	0	56	76
Tennessee:											
Knoxville	0	------	0	0	0	1	0	1	1	2	24
Memphis	0	1	0	15	0	2	0	6	2	18	87
Nashville	0	------	0	0	2	1	0	1	0	8	52
Alabama:											
Birmingham	0	------	0	2	8	0	0	5	0	3	59
Mobile	0	------	0	0	0	0	0	0	0	0	18
Montgomery	0	------	------	0	------	4	0	------	1	0	------
Arkansas:											
Fort Smith	0	------	------	0	------	3	0	------	0	0	------
Little Rock	0	------	0	0	2	0	0	2	0	0	5

City reports for week ended July 31, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	0	0	0	2
New Orleans	4	8	0	0	11	2	0	14	9	14	160
Shreveport	0	------	0	0	3	0	0	1	1	0	53
Oklahoma:											
Muskogee	1	------	------	0	------	0	0	------	0	0	------
Oklahoma City	0	------	0	0	2	0	0	0	8	2	43
Tulsa	0	------	------	8	------	1	0	------	1	30	------
Texas:											
Dallas	3	------	0	1	8	3	0	8	0	9	59
Fort Worth	2	------	0	0	1	0	0	1	2	5	26
Galveston	0	------	0	0	2	0	0	0	3	0	17
Houston	2	------	0	0	4	1	0	7	8	0	87
San Antonio	0	------	0	2	5	1	0	8	0	1	63
Montana:											
Billings	0	------	0	0	2	0	0	0	0	0	5
Great Falls	0	------	0	0	1	0	0	0	0	10	11
Helena	0	------	0	0	0	0	1	0	0	0	3
Missoula	0	------	0	0	1	1	0	0	0	0	11
Idaho:											
Boise	0	------	0	0	1	0	0	0	0	0	5
Colorado:											
Colorado Springs	0	------	0	1	0	0	0	2	0	1	17
Denver	5	------	0	28	6	4	0	1	1	24	75
Pueblo	0	------	0	0	1	1	0	0	1	3	6
New Mexico:											
Albuquerque	0	------	0	0	1	1	0	3	0	2	17
Utah:											
Salt Lake City	0	------	0	20	0	2	0	0	0	10	26
Washington:											
Seattle	0	------	0	4	5	1	0	3	1	32	72
Spokane	0	------	0	13	2	2	0	0	0	9	30
Tacoma	0	------	0	0	2	0	0	1	1	8	26
Oregon											
Portland	0	------	0	1	1	3	4	3	0	1	78
Salem	0	------	------	0	------	0	0	------	0	0	------
California:											
Los Angeles	4	1	0	8	8	6	4	26	2	93	319
Sacramento	1	------	0	1	0	1	0	2	0	9	21
San Francisco	0	------	0	2	2	3	0	3	0	27	140

City reports for week ended July 31, 1936—Continued

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Maine:			
Portland	0	0	1
New Hampshire:			
Nashua	0	0	1
Massachusetts:			
Boston	0	0	5
Worcester	0	0	1
Rhode Island:			
Providence	1	1	0
Connecticut:			
Hartford	0	0	1
New York:			
New York	3	0	7
Syracuse	1	0	0
New Jersey:			
Newark	0	0	2
Trenton	1	0	0
Pennsylvania:			
Philadelphia	0	0	3
Ohio:			
Cincinnati	0	0	16
Cleveland	1	0	0
Columbus	0	0	1
Indiana:			
Muncie	0	0	5
Illinois:			
Chicago	0	0	7
Michigan:			
Detroit	0	0	4
Wisconsin:			
Milwaukee	0	0	2
Minnesota:			
St. Paul	0	0	1
Missouri:			
Kansas City	0	0	3
Nebraska:			
Omaha	0	0	11
Kansas:			
Wichita	1	1	1
Maryland:			
Baltimore	2	0	6
District of Columbia:			
Washington	0	0	1
West Virginia:			
Wheeling	0	0	1
North Carolina:			
Wilmington	1	0	0
Kentucky:			
Covington	0	0	4
Louisville	0	0	3
Tennessee:			
Memphis	0	0	2
Alabama:			
Birmingham	1	0	0
Arkansas:			
Little Rock	0	0	3
Louisiana:			
New Orleans	0	0	3
Oklahoma:			
Tulsa	0	0	4
Texas:			
Dallas	0	0	3
Fort Worth	0	0	2
Houston	1	0	8
San Antonio	1	0	0
Colorado:			
Denver	1	0	0
Pueblo	0	0	2
California:			
Los Angeles	2	0	6
Sacramento	0	0	2

Encephalitis, epidemic or lethargic.—Cases: Springfield, 1; Cleveland, 1; Anderson, Ind., 1.

Pellagra.—Cases: Philadelphia, 1; Wilmington, N. C., 1; Winston-Salem, 2; Charleston, S. C., 1; Savannah, 4; Nashville, 1; Birmingham, 1; Dallas, 1; San Francisco, 1.

Rabies in man.—Death: Galveston, 1.

Typhus fever.—Cases: New York, 1; Charleston, S. C., 2; Atlanta, 2; Savannah, 3; Tampa, 1; Mobile, 1; Galveston, 1. Deaths: New York, 1.

FOREIGN AND INSULAR

BRAZIL

Santos—Poliomyelitis.—A report dated July 28, 1937, from the American Consulate in Santos, Brazil, stated that, according to unofficial information, an epidemic of poliomyelitis had appeared in Santos. More than 20 cases had been reported, with 2 deaths.

CANADA

Provinces—Communicable diseases—2 weeks ended July 17, 1937.—During the 2 weeks ended July 17, 1937, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis					2					2
Chicken pox		2		81	206	5	130	15	27	466
Diphtheria		1	4	41	24	2				72
Dysentery				1						1
Erysipelas				6	4	2		2	7	21
Influenza	1			2		7	20			30
Lethargic encephalitis					1		1			2
Measles		72	1	216	595	104	157	120	72	1,337
Mumps		9	2		98	2	26	1	22	160
Paratyphoid fever					8					8
Pneumonia	5				15		4		6	30
Poliomyelitis				2	10					12
Scarlet fever		14	11	122	115	12	24	52	18	368
Smallpox								3		3
Trachoma									2	2
Tuberculosis	10	81	42	156	128	23	2	2	29	423
Typhoid fever		1	7	17	8	1	1	1	1	37
Undulant fever				4	9	1	1			15
Whooping cough		15		417	114	95	27		11	679

CUBA

Provinces—Notifiable diseases—4 weeks ended July 24, 1937.—During the 4 weeks ended July 24, 1937, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1	1	1	7		5	15
Chicken pox					1		1
Cerebrospinal meningitis		1					1
Diphtheria	3	15	1	3	1	5	28
Dysentery (amebic)		1					1
Dysentery (bacillary)				1	1		2
Hookworm disease	1						1
Leprosy	1	4		2	3	3	13
Malaria	65	33	25	192	70	316	701
Measles		1	13	1		1	16
Poliomyelitis	1	1				3	5
Tuberculosis	74	31	31	63	12	41	252
Typhoid fever	23	73	29	75	21	55	276
Yaws						5	5

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for July 30, 1937, pages 1054–1068. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued August 27, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Plague

Argentina.—During the second half of July 1937, 9 fatal cases of pneumonic plague were reported in the Departments of Godoy Cruz and Rivadavia, Mendoza Province, and 6 fatal cases were reported in Colonia San Juan, Figueroa Department, Santiago del Estero Province.

Hawaii Territory—Island of Hawaii—Hamakua District—Honokaa Sector.—Plague infection was reported in 1 rat on July 29, and in another rat on August 7, 1937, both from Honokaa Sector, Hamakua District, Island of Hawaii.

India—Rangoon.—On July 24, 1937, 1 case of plague was reported in Rangoon, India.

United States—Montana—Beaverhead County.—A report of plague infection in a ground squirrel in Beaverhead County, Mont., appears on page 1161 of this issue of PUBLIC HEALTH REPORTS.

United States—Nevada—Ormsby County.—A report of plague infection in fleas taken from chipmunks in Ormsby County, Nev., appears on page 1161 of this issue of PUBLIC HEALTH REPORTS.

Typhus Fever

Egypt.—During the week ended July 31, 1937, 4 cases of typhus fever with 1 death were reported in Alexandria and 1 case in Suez, Egypt. One case was reported in Ismailia during the week ended July 29.

Yellow Fever

Colombia.—Yellow fever has recently been reported in Colombia as follows: Boyaca Department, Borbur, July 12, 1937, 2 deaths; Muzo, May 28, 1 case, July 2, 1 case.

Gold Coast—Afitey.—On July 31, 1937, 1 case of yellow fever was reported in Afitey, Gold Coast.

Nigeria—Forcados.—On July 22, 1937, 1 fatal case of yellow fever was reported in Forcados, Nigeria.

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UNITED STATES TREASURY DEPARTMENT

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ISSUED WEEKLY

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 52 AUGUST 27, 1937 NO. 35

SICKNESS AMONG MALE INDUSTRIAL EMPLOYEES DURING THE FIRST QUARTER OF 1937[1]

By DEAN K. BRUNDAGE, *Senior Statistician, United States Public Health Service, Division of Industrial Hygiene, National Institute of Health*

The unfavorable rate of disability among a sample of industrial employees reported for the final quarter of 1936 persisted through the first quarter of 1937. Sickness, including nonindustrial accidents, which caused absence from work for 8 calendar days or longer occurred at a higher frequency, 148.1 cases per 1,000 employees, in the first quarter of this year than was recorded for the same period of any year since 1929; and, as in 1929, the excessive rate was primarily due to an outbreak of influenza. The average annual rate for this disease among all the members of the different cooperating establishments during the first quarter of 1937 was 61.7 cases per 1,000; however, the average frequency of influenza for the members of many of the reporting companies was more than double this number. The employees of one establishment during this quarter year experienced a rate of 180 cases of influenza per 1,000 employees.

The average annual rate for pneumonia in the first quarter of 1937, 4.5 cases per 1,000 employees, was not as high as in the same quarter of 1936, 4.9 cases per 1,000, but exceeded the average rate for the 5-year period 1932–36 by 28 percent. As may be expected during an influenza epidemic, other respiratory diseases such as bronchitis, diseases of the pharynx and tonsils, and "other respiratory diseases", including diseases of the upper respiratory system, also occurred at rates in excess of those for the corresponding quarters of the previous years when there were no observable epidemics.

The Metropolitan Life Insurance Co.[2] reports, "Influenza and pneumonia caused more deaths during the winter months of 1937 than they have at this season for several years past. This year's [1937] mortality rate, to date, from influenza is higher than it has been since 1933, and the death rate from pneumonia is the highest since 1931."

[1] A report covering the final quarter of 1936 and the year 1936 as a whole was published in the Public Health Reports for Apr. 30, 1937, vol. 52, no. 18, pp. 537–539.

[2] Statistical Bulletin, Metropolitan Life Insurance Co., vol. 18, no. 4, Apr. 1937, p. 8.

TABLE 1.—*Frequency of disability lasting 8 calendar days or longer in the first quarter of 1937, compared with the first quarter of preceding years. (Male morbidity experience of industrial companies which reported their cases to the United States Public Health Service)* [1]

Diseases and disease groups which caused disability. (Numbers in parentheses are disease title numbers from the International List of the Causes of Death, fourth revision, Paris, 1929)	Annual number of disabilities per 1,000 men in the first quarter of—		
	1937	1936	5 years, 1932-36
Sickness and nonindustrial injuries [2]	148.1	113.1	110.8
Nonindustrial injuries	10.2	11.3	11.1
Sickness [2]	137.9	101.8	99.7
Respiratory diseases	88.5	53.8	51.6
Bronchitis, acute and chronic (106)	7.5	7.2	5.4
Diseases of the pharynx and tonsils (115a)	6.0	5.4	5.3
Influenza and grippe (11)	61.7	29.1	30.7
Pneumonia, all forms (107-109)	4.5	4.9	3.5
Tuberculosis of the respiratory system (23)	.7	.8	1.0
Other respiratory diseases (104, 105, 110-114)	8.1	6.4	5.7
Nonrespiratory diseases	49.4	48.0	48.1
Diseases of the stomach, cancer excepted (117-118)	3.9	3.5	3.7
Diarrhea and enteritis (120)	.9	1.2	1.0
Appendicitis (121)	4.5	4.0	3.6
Hernia (122a)	1.5	1.8	1.7
Other digestive diseases (115b, 116, 122b-129)	2.8	2.9	3.1
Rheumatic group, total	9.7	10.1	11.5
Rheumatism, acute and chronic (56, 57)	4.4	4.4	5.6
Diseases of the organs of locomotion (156b)	2.7	3.4	3.4
Neuralgia, neuritis, sciatica (87a)	2.6	2.3	2.5
Neurasthenia and the like (part of 87b)	.8	.9	.9
Other diseases of the nervous system (78-85, part of 87b)	.8	1.3	1.4
Diseases of the heart and arteries, and nephritis (90-99, 102, 130-132)	4.8	4.6	4.3
Other genito-urinary diseases (133-138)	2.1	2.5	2.4
Diseases of the skin (151-153)	3.2	2.4	2.4
Infectious and parasitic diseases except influenza (1-10, 12-22, 24-33, 36-44)	3.9	3.5	3.2
Ill-defined and unknown causes (200)	3.6	2.3	2.1
All other diseases (45-55, 58-77, 88, 89, 100, 101, 103, 154-156a, 157, 162)	6.9	7.0	6.8
Average number of males covered in the record	173,617	145,701	142,436
Number of companies included	26	26	----------

[1] In 1936 and 1937 the same companies are included. The rates for the first quarters of the years 1932 to 1936 include 21 of these companies, which employed an average of 113,264 men during these months, or 80 percent of the 142,436 men representing the sample population for the 5-year average.
[2] Exclusive of disability from the venereal diseases and a few numerically unimportant causes of disability.

The one and only favorable rate among the specific respiratory diseases in this quarter as compared with the corresponding quarter of 1936 or of the 5 preceding years is the rate for tuberculosis of the respiratory system, the average annual rate for which was 0.7 case per 1,000 members. Never has this particular rate been found to be lower among this group of industrial employees.

Of the digestive diseases, only appendicitis caused disability more often during the first 3 months of 1937 than in the same months of 1936 or of the 5-year period 1932–36. In fact, 4.5 cases of appendicitis per 1,000 employees is the all-high for this disease since the first quarter of 1929.

The rate of 9.7 cases per 1,000 industrial workers for the rheumatic group of diseases was favorable as compared with the same months of preceding years.

For diseases of the skin, the rate 3.2 cases per 1,000 members, as compared with 2.4 cases for 1936 and also the 5-year period 1932–36, shows an increase of 33 percent in frequency.

This report for the first quarter of 1937 is a continuation of like reports on morbidity statistics published by the United States Public Health Service. It relates to the average frequency of new cases of sickness and nonindustrial injuries causing absence from work for 8 calendar days or longer among approximately 174,000 male industrial employees during the first 3 months of 1937 as compared with the like period of 1936 and the 5-year period 1932–36. The data were computed from periodic reports received from 26 sick-benefit associations or relief departments of establishments located east of the Mississippi and north of the Ohio and Potomac Rivers.

THE ELIMINATION OF SELENIUM AND ITS DISTRIBUTION IN THE TISSUES [1]

By M. I. Smith, *Principal Pharmacologist*; B. B. Westfall, *Assistant Chemist*, and E. F. Stohlman, Jr., *Pharmacologist, Division of Pharmacology, National Institute of Health, United States Public Health Service*

A partial survey of the rural population in three of the Great Plains States in 1936 disclosed that a surprisingly large percentage of people living on seleniferous soil were excreting selenium in the urine, in many instances in appreciable amounts (*1*). No data were available at the time as to the precise sources of selenium or the actual amounts ingested. Though signs of ill health were often elicited in individuals excreting selenium in the urine it was not possible to be certain as to cause and effect in view of the vagueness of the symptomatology and the failure to recognize signs or symptons that might be considered pathognomonic of selenium poisoning. Two series of experiments were therefore undertaken: One with a view to ascertaining the toxic effects and pathologic manifestations of graded doses of selenium administered to experimental animals over an extended period of time; the other with the object of ascertaining the manner and rate of elimination of selenium when so administered, in the hope that such information might be useful in arriving at some conclusion regarding the probable quantitative intake of selenium in man exposed to its hazards. The results of the first mentioned problem have been reported elsewhere (*2*). The present investigation deals with the phases of excretion of selenium and its distribution in the tissues of animals in chronic selenium poisoning.

Quarelli (*3*) in 1913 found selenium in the blood, liver, and spleen of animals treated with the colloidal metal. Filippi (*4*), working with

[1] Presented before the Pharmacological Society at its annual meeting in Memphis, Apr. 21-24, 1937.

the soluble salts of selenious and selenic acids, as well as with colloidal selenium, also found selenium in appreciable amounts in the liver and at times also in smaller amounts in the lungs, intestines, blood, and other tissues. More recently Dudley (*5*), using more satisfactory analytical methods, demonstrated selenium in the excreta and in many tissues of the body of livestock in acute or subacute poisoning with sodium selenite or with heavily contaminated seleniferous plants. Munsell, De Vaney, and Kennedy (*6*), studying chronic selenium poisoning in rats, found that a small proportion of the selenium ingested was stored in the tissues and that a very considerable percentage of it was excreted in the urine and feces.

SCOPE AND MATERIAL

In the present investigation we were concerned chiefly with the paths of elimination, the rate of excretion, and the tissue distribution of selenium in relation to the daily intake when administered to cats as sodium selenite, either orally or subcutaneously. The cats were kept in metabolism cages and maintained on a diet of raw lean beef and milk. They had free access to water at all times. The urines were collected at 3- or 4-day intervals with toluol as a preservative. The total quantities excreted were noted, and aliquot samples, usually of 100 cc treated with 5 cc concentrated nitric acid, were saved for selenium analysis. Samples of feces were also collected over a sufficiently long period of time and analyzed in order to obtain a fair estimate of the total amount of selenium so excreted. In this manner data were obtained showing, first, the concentration of selenium in the urine and feces on a given daily dose, and, second, the total amount excreted in the urine and feces in relation to the total intake of selenium over a given period of time. At death, or at the end of a suitable observation period when the animals were sacrificed, samples of tissues were taken for selenium analyses. In several instances the animals were exsanguinated from the carotid artery under ether anesthesia, the blood was oxalated, and separate analyses were made on the washed erythrocytes and the plasma plus the washings.

The analytical methods employed were essentially the same as those previously used and described in connection with the analytical work on human urines (*1*).

RESULTS

The data obtained in this series of experiments are summarized in three tables. Table 1 shows the urinary and fecal excretion of selenium in 25 cats receiving daily doses of from 0.02 to 0.25 mg per kilo of the element over an observation period of from 15 to 188 days. Analysis of the data shows that from 28 to 90 percent, and usually from about 50 to 80 percent, of the total intake of selenium is excreted

in the urine. In general, it would seem that the percentile urinary excretion is higher with the smaller doses of 0.02 and 0.1 mg per kilo than with the larger and definitely toxic dose of 0.25 mg per kilo. Also the percentile urinary excretion of selenium appears somewhat higher in animals receiving it subcutaneously than in those receiving it orally. The estimated fecal excretion of selenium has not exceeded 18 percent of the total intake, and is decidedly less in animals receiving it subcutaneously than in those receiving it orally. It thus seems probable that some of the fecal selenium in animals receiving sodium selenite orally may represent unabsorbed selenium.

TABLE 1.—*Excretion of selenium in cats receiving selenium daily as sodium selenite*

Cat. No.	Weight, kilos	Daily dose Se, mg per kilo	Route	Days	Total intake, mg	Total excretion		Excretion, percent of intake		Average concentration of selenium, micrograms percent		Remarks
						Urine mg	Feces mg	Urine	Feces	Urine	Feces	
1	3.3	0.25	Oral	144	104.5	43.7	------	42	------	403	------	Survived.
9	3.0	.25	do	55	35.3	19.8	------	55	------	357	------	Died.
10	5.7	.25	do	144	166.0	45.5	30.0	28	18	427	2,640	Survived.
11	1.5	.25	do	135	49.0	26.6	8.0	56	16	299	1,870	Sick, killed.
12	1.1	.25	do	160	27.5	14.7	------	53	------	240	------	Died
2	3.0	.25	Subcutaneous	27	12.0	4.5	------	36	------	435	------	Do.
21	3.5	.25	do	69	51.6	30.9	.2	60	0.4	430	91	Survived.
22	2.9	.25	do	62	36.7	19.2	1.6	53	4	349	636	Sick, killed.
23	2.0	.25	do	15	7.0	1.9	.1	28	1.4	440	195	Do.
13	2.0	.10	Oral	175	38.0	22.0	5.0	58	13	162	456	Survived.
14	2.7	.10	do	168	48.5	28.1	7.5	58	16	198	936	Do.
15	3.1	.10	do	174	59.0	31.9	2.8	53	5	193	228	Do.
16	2.0	.10	do	40	8.6	7.9	0.9	90	10	160	448	Died.
17	2.6	.10	Subcutaneous	168	52.0	36.6	3.7	70	7	200	400	Survived.
18	3.0	.10	do	185	61.2	52.6	2.5	86	4	241	195	Do.
19	2.0	.10	do	185	38.3	31.9	1.5	83	4	214	135	Do.
20	1.9	.10	do	188	45.8	25.8	1.6	56	3	172	148	Do.
28	3.8	.02	Oral	122	8.5	5.7	1.0	67	12	57	118	Do.
29	3.3	.02	do	76	3.3	1.9	------	58	------	34	------	Do.
30	3.4	.02	do	87	5.4	3.4	------	63	------	49	------	Do.
31	2.7	.02	do	87	4.2	2.5	------	60	------	45	------	Do
24	2.8	.02	Subcutaneous	136	7.8	7.2	.2	90	3	62	31	Do.
25	2.7	.02	do	128	7.2	5.3	.3	74	4	42	53	Do.
26	2.3	.02	do	127	5.2	4.3	Trace	83	0	41	Trace	Sick, killed.
27	3.2	.02	do	122	7.4	4.6	.2	61	3	39	35	Survived.

As for the remainder of the selenium unaccounted for in the urine and feces, some of it is stored in the body and some must be eliminated by other pathways. In this connection it may be recalled that, in 1894, Hofmeister (*7*) suggested that selenium might in part be excreted through the lungs as volatile compounds. This suggestion received confirmation in 1913 by Filippi (*4*).

Of particular interest are the figures showing the average concentration of selenium in the urine, expressed in micrograms per 100 cc, in relation to the daily intake. Though there is considerable variation in the urinary concentration of selenium at different times in an animal on a given daily dose, there is, nevertheless, a rather definite relationship between the dose administered and its average concentration in

the urine over an extended period. Thus, a daily dose of 0.25 mg per kilo has resulted in an average excretion usually of from 300 to 400 micrograms percent; a daily dose of 0.1 mg per kilo resulted in an excretion of about 200 micrograms percent or somewhat less; while a daily dose of 0.02 mg per kilo gave an average excretion level of from 34 to 62 micrograms percent. The concentration of selenium in the feces is much more variable, may be quite high when relatively large doses are given orally, and bears no such definite relationship to the daily intake in chronic poisoning as appears to prevail in the instance of the urine.[2]

The distribution and storage of selenium in the tissues of cats in chronic poisoning with sodium selenite are shown in table 2. It is quite obvious that tissue selenium depends on the daily dose and the route of administration. In general the liver, kidney, spleen, and pancreas contain the highest concentrations of selenium. The heart and lungs come next in order, and may contain considerable amounts, especially when given subcutaneously in the somewhat larger dose of 0.25 mg per kilo.[3] The blood in chronic poisoning contains relatively small amounts of selenium, the erythrocytes containing more than the plasma. Small amounts or traces of selenium may be found apparently in every tissue of the body in chronic poisoning.

TABLE 2.—*The distribution of selenium in the tissues of cats in chronic poisoning with sodium selenite*

Tissue	Average selenium (micrograms per 100 gm)			
	Daily dose 0.25 mg selenium per kilo		Daily dose 0.1 mg selenium per kilo	
	Subcutaneous	Oral	Subcutaneous	Oral
Liver	372 (4)	213 (5)	138 (3)	77 (1)
Kidney	422 (4)	145 (5)	235 (3)	150 (1)
Spleen	291 (2)	115 (2)	37 (3)	
Pancreas	565 (2)	142 (2)	77 (3)	
Heart	241 (2)	85 (5)	30 (3)	
Lungs	122 (4)	44 (5)	45 (3)	Trace (1)
Erythrocytes	76 (1)	42 (2)	23 (3)	
Plasma	36 (1)	9 (2)	17 (3)	
Intestine	28 (4)	22 (2)		Trace (1)
Muscle	23 (4)	16 (5)	8 (1)	9 (1)
Bone	22 (3)	19 (3)		Trace (1)
Fat	13 (1)	Trace (3)		
Skin		10 (2)	Trace (3)	
Brain	46 (2)	Trace (2)		

NOTE.—Figures in parentheses indicate number of experiments.

Some observations on the selenium content in pooled samples of bile of rabbits and cats in acute and subacute poisoning with sodium selenite or selenate given in doses of 0.5 to 3 mg per kilo showed that

[2] Detailed data concerning the effects of the doses of selenium shown in this table may be found in the paper on the toxicity and pathology of selenium (*2*.)

[3] This, it may be pointed out here, is about 10 percent of the minimum lethal dose.

when these compounds were administered orally the selenium content was low, 36 and 48 micrograms percent respectively in two series of experiments. When the selenium was administered subcutaneously or intravenously in similar doses in another group of animals the selenium content of the bile was comparatively high, 336 micrograms percent.

It was of interest to ascertain how long selenium is retained in the body after its administration is discontinued in cases of chronic poisoning with small daily doses. In this experiment 4 cats that had received 0.1 mg selenium per kilo per day over a period of from 168 to 175 days were used. Three of these animals had received the selenium as sodium selenite orally and one subcutaneously. At the time when the administration of selenium was discontinued they were excreting from 190 to 252 micrograms of selenium per 100 cc, as shown in table 3. Within 2 weeks there was a sharp reduction in the urinary selenium, showing that the bulk of it is eliminated within that time. Small amounts of selenium, however, persisted in the urine; a month later they were still eliminating some 3 to 19 micrograms percent. The animals were killed at that time, and analysis of the livers showed a concentration of from 17 to 29 micrograms per 100 grams. The combined kidneys and spleens of the four animals showed but 9 micrograms percent. It would seem, therefore, that the bulk of selenium administered as sodium selenite leaves the body rather rapidly, though small amounts may be retained for a month and possibly longer.

TABLE 3.—*The persistence of selenium in the tissues and urine 1 month after discontinuing its administration*

Cat No.	Urinary selenium at end of administration (micrograms percent)	Selenium, micrograms percent 1 month later		
		Urine	Liver	Spleen and kidney
13	252	19	17	9. Composite sample of cats 13, 14, 15, and 17.
14	225	5	22	
15	190	4	27	
17	192	3	29	

DISCUSSION

Intimately connected with the general problem of selenium as a possible health hazard to man in selenium endemic regions are the following: (1) The precise sources of selenium to which man is exposed; (2) the chemical nature of the selenium; (3) the probable amounts of selenium absorbed by man in the areas where it is known to occur in the soil and vegetation; and (4) the limits of tolerance—in other words, how much of it may be absorbed with impunity.

Data are now being accumulated in this laboratory which we believe will give information on the first question. There is no definite information at present on the second question other than that the selenium to which man is exposed is probably for the most part, though not exclusively, organic in nature. If the fate of naturally occurring organic selenium is similar to that of soluble inorganic selenium, we believe the data in this paper furnish at least a partial answer to the third question. It was previously reported from this laboratory that in about 50 percent of the subjects studied, representing 90 families living on seleniferous soil, selenium was found in the urine in amounts varying from 20 to 133 micrograms percent (*1*). In a second field survey in the fall of 1936, the results of which will be published later, nearly 200 micrograms percent has been found in the urine of some subjects. This, in the light of our present experiments, would seem to indicate a daily absorption of 1 to 2, and in some cases possibly as high as 5, milligrams of selenium for the average adult. From the results which we have reported recently on the toxicity and pathology of inorganic selenium (*2*), it does not seem probable that such quantities of selenium could be absorbed more or less continually with impunity. Work now in progress on the toxicity of naturally occurring organic selenium and its fate in the body may throw further light on this subject.

SUMMARY

The urinary and fecal excretion of selenium in cats receiving graded doses of selenium as sodium selenite over periods of from 15 to 188 days has been studied. From 50 to 80 percent of the total intake is usually excreted in the urine and from traces to 18 percent is excreted in the feces. More is excreted in the feces when the selenium is given orally than when given subcutaneously.

A fairly definite relationship has been found between the selenium concentration in the urine and the daily dose administered in chronic selenium poisoning. This seems to furnish a basis for estimating the amount of selenium absorbed by man in chronic poisoning from a knowledge of the concentration of selenium excreted in the urine.

In chronic poisoning with inorganic selenium the element is widely distributed throughout the body tissues, being found in highest concentrations in the liver, kidney, spleen, pancreas, heart, and lungs. In the blood there is more selenium in the erythrocytes than in the plasma.

The bulk of stored selenium in chronic poisoning with small doses of inorganic selenium is eliminated within 2 weeks after its administration is discontinued. Small amounts persist in the urine and in some of the tissues, especially the liver, for a month, and possibly longer.

The bearing of these findings upon the problem of the selenium health hazard in man is discussed.

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NOTES ON THE CONTINUOUS REARING OF AËDES AEGYPTI IN THE LABORATORY

By H. A. Johnson, *Passed Assistant Sanitary Engineer, United States Public Health Service*

From an experimental standpoint and for the study of certain epidemics, it is sometimes desirable to raise continuously in the laboratory large numbers of *Aëdes aegypti* with a minimum of time and attention. As some difficulties have been encountered in maintaining broods of this mosquito, a study was undertaken to establish a convenient routine for the rapid development of a colony of this species and for its maintenance thereafter.

The *Aëdes* family as a whole lays eggs just above the water surface rather than on it, and *Aëdes aegypti* shows this characteristic strongly. It was observed by dissection that in freshly laid eggs the embryo was not developed, and that as the eggs aged, development of the embryo progressed to the point of hatching provided the eggs were kept moist. If the eggs dried out, the young embryos died before maturity.

Practically all of the observations here reported were made at room temperatures of 70° to 75° F., and under these conditions it was noted that approximately 100 hours elapsed from the time the egg was laid until the embryo was fully developed and ready to hatch.

It was found that pieces of coarse wet sponges, the equivalent of a 2-inch cube in size, were very attractive to the insects as a place on which to deposit eggs. These sponges were removed daily and kept moist, but not soaking wet, for varying periods before being allowed to dry. It was observed that with sponges kept moist 20 hours and then dried and submerged, only a small percentage of the contained eggs would hatch and that the hatching was very slow; only about 45 percent of the eggs hatched after 79 hours of submergence. Resubmerging of the same sponges after drying produced further hatches even up to eight different submergences.

Other groups of sponges containing eggs were held moist for periods of 48, 72, and 96 hours, and as this "ripening" period increased, the hatch took place more quickly and more completely as the dry sponges were submerged. If held moist for more than 96 hours, some hatching of larvae occurred on the moist sponges.

Taking 96 hours as the most satisfactory time to allow the egg sponges to remain moist, or to "ripen", the next question seemed to be how long such "ripened" eggs could be held dry on the sponges and still hatch when submerged. Dry egg-laden sponges were held for as long as 2 months and gave a prompt hatch of 75 percent or better when submerged. The percentage of larvae hatched decreased to 50 percent or below if the sponges were held dry 10 to 12 weeks.

In maintaining a brood of mosquitoes, they must, of course, be given a blood meal regularly in order to produce fertile eggs. During the study the following observations were made on the adults:

Adult *Aëdes aegypti* live and reproduce very nicely in small improvised cages. They can be expected to take the first blood meal 20 to 40 hours after emerging from the pupal stage, but they will usually not feed on blood thereafter except at 2-day intervals. In captivity the 2-day period seems necessary for the digestion of a blood meal.

Adults commence to lay eggs 4 to 6 days after the first blood meal; the laying period from a single feeding covers 3 to 4 days. From records of four groups an average egg yield per insect per bite (for the first blood meal) was 6 to 20 eggs.

In each group of insects it was intended to keep approximately equal numbers of males and females; but if no additions were made, it was invariably noted that at the end of 30 days there had been a high mortality among the males and almost none among the females. It appears, therefore, that in captivity males are shorter lived than females. More males than females always came through from eggs, and possibly this is nature's method of keeping the sexes approximately equal in number.

Groups of adult females properly fed and confined with males produced hatchable eggs in quantity to an age of 6 weeks. At the end of that period new broods were substituted.

SUMMARY OF OBSERVATIONS

The experiments here reported covered a period of two winter seasons and demonstrate quite clearly the advantages of the following procedure for the continuous rearing of groups of *Aëdes aegypti* in the laboratory:

Adults.—These should be captured in nature and, if used to start a brood, should be confined in cages and allowed to lay eggs without a further blood meal. A cage 20 by 20 by 16 inches, with cellophane sides, will care for 150 to 200 insects. The insect cage should have a

sleeve for manipulation. Sugar water on a small ball of cotton should be kept continuously in the cage as food (especially for males). A dripping wet piece of sponge about the size of a 2-inch cube should be put in the cage each day and removed each morning if any eggs appear on it. Caged specimens reared from eggs in the laboratory should be offered blood each day by inserting the arm into the cage, or by introducing laboratory animals.

Eggs.—The withdrawn sponges with eggs should be kept moist but not dripping wet for a period of 96 hours and then allowed to dry naturally. Such ripened eggs will remain viable for at least 2 months. Sponges may be kept moist by placing them directly on wet cotton or wet blotting paper, or they may be placed on wet cotton all enclosed in a covered container.

Rearing larvae.—The dry sponges are immersed in shallow white enameled trays (in ordinary tap water) for 18 to 24 hours and then discarded. The young larvae should now be fed regularly every 2 days with yeast or pablum and the water changed if it becomes very offensive in odor. Pupae should appear in 7 to 8 days and should be removed to test tubes and placed in the adult cages to hatch. Pablum (a powdered breakfast food) was found more convenient than yeast for feeding larvae.

It is believed that the methods outlined here constitute a simple and efficient means of maintaining groups of *Aëdes aegypti* in the laboratory. The ripening process to which the eggs are submitted permits not only more efficient reproduction of the species, but by enabling the holding of eggs and consequent grouping of emerging insects, it reduces time and effort to a minimum.

FLEAS, TICKS, AND LICE RETAIN PLAGUE INFECTION AFTER 10 MONTHS IN ICEBOX

According to a report dated August 9, 1937, from Dr. W. M. Dickie, Director of Public Health of California, specimens of fleas, ticks, and lice, taken from ground squirrels (*beecheyi*) in San Mateo County during September 1936, and stored in the icebox until July of this year, produced typical plague infection when inoculated into guinea pigs. The following lots, all collected on September 25, 1936, were proved positive by guinea-pig inoculation:

15 fleas and 3 ticks from 1 *beecheyi* squirrel.
1 tick, 61 fleas, and 11 lice from 2 *beecheyi* squirrels.
36 lice and 24 fleas from 1 *beecheyi* squirrel.
29 fleas and 4 lice from 2 *beecheyi* squirrels.
31 fleas and 11 lice from 1 *beecheyi* squirrel.

All of the examinations were made by Dr. K. F. Meyer, Director of the Hooper Foundation for Medical Research.

DEATHS DURING WEEK ENDED AUG. 7, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug. 7, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	7,334	6,972
Average for 3 prior years	7,127	
Total deaths, first 31 weeks of year	280,048	280,943
Deaths under 1 year of age	541	461
Average for 3 prior years	537	
Deaths under 1 year of age, first 31 weeks of year	17,770	17,598
Data from industrial insurance companies		
Policies in force	69,616,242	68,159,773
Number of death claims	11,894	12,210
Death claims per 1,000 policies in force, annual rate	8.9	9.4
Death claims per 1,000 policies, first 31 weeks of year, annual rate	10.4	10.4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 14, 1937, and Aug. 15, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936
New England States:								
Maine	------	1	------	1	------	7	0	0
New Hampshire	------	------	------	------	------	3	0	0
Vermont	------	------	------	------	------	1	0	0
Massachusetts	7	6	------	------	23	52	5	4
Rhode Island [1]	------	------	------	------	------	------	0	0
Connecticut	7	1	------	------	15	10	0	0
Middle Atlantic States:								
New York	14	18	[2] 7	[2] 1	130	120	3	8
New Jersey	7	8	------	10	91	52	3	2
Pennsylvania [1]	9	17	------	------	213	53	6	3
East North Central States:								
Ohio	12	17	6	9	125	32	5	8
Indiana [1]	12	15	3	5	23	------	2	0
Illinois [1]	14	21	4	3	72	7	2	1
Michigan	16	7	------	------	60	13	0	2
Wisconsin	2	1	21	11	18	16	0	0
West North Central States:								
Minnesota	3	2	1	------	3	5	0	0
Iowa [1]	1	3	------	------	5	------	0	0
Missouri	15	8	32	22	15	1	0	1
North Dakota	2	------	3	------	2	------	1	0
South Dakota	------	1	------	------	2	3	1	0
Nebraska	------	2	------	------	1	5	0	1
Kansas	------	7	------	------	6	1	1	2
South Atlantic States:								
Delaware	------	------	------	------	2	1	0	0
Maryland [1, 3]	3	6	------	2	4	18	5	3
District of Columbia	3	4	------	------	5	4	0	3
Virginia [1]	10	10	------	------	31	43	4	1
West Virginia [1]	3	11	12	2	13	32	0	0
North Carolina [1, 4]	22	16	------	2	32	1	3	0
South Carolina [4]	8	2	54	52	------	5	0	0
Georgia [4]	10	13	------	------	------	------	0	2
Florida [4]	5	1	1	------	7	2	0	0
East South Central States:								
Kentucky	10	6	------	------	17	8	1	2
Tennessee [1, 4]	4	16	10	11	25	4	1	2
Alabama [4]	11	9	3	5	4	2	4	0
Mississippi [3]	15	6	------	------	------	------	0	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 14, 1937, and Aug. 15, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936
West South Central States:								
Arkansas	13	5	7	6	4		1	0
Louisiana [4]	16	14	11	20	1	5	0	2
Oklahoma [5]	6	4			4	1	4	0
Texas [4]	20	28	39	40	68	12	6	1
Mountain States:								
Montana	1	1		2	3		0	2
Idaho			1		2	3	0	0
Wyoming [1, 6]					4	1	0	0
Colorado	3	1			14	8	1	1
New Mexico		1			11	8	0	0
Arizona			12	16		6	1	1
Utah [3]					21	9	0	0
Pacific States:								
Washington	1	1			10	6	0	0
Oregon [1]	6			6	7	3	0	0
California	18	26	5	11	18	55	3	3
Total	309	316	232	237	1,111	613	63	56
First 32 weeks of year	13,402	14,412	274,261	139,921	240,265	266,841	4,120	5,828

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936
New England States:								
Maine	8	6	5	2	0	0	4	4
New Hampshire	1	0	1	2	0	0	0	0
Vermont	2	0		1	0	0	0	0
Massachusetts	25	1	20	41	0	0	4	2
Rhode Island [1]	2	0	3		0	0	2	1
Connecticut	3	1	6	8	0	0	2	2
Middle Atlantic States:								
New York	22	7	76	101	11	0	25	28
New Jersey	6	0	14	30	0	0	10	11
Pennsylvania [1]	14	5	74	75	0	0	33	18
East North Central States:								
Ohio	45	11	106	98	0	4	41	16
Indiana [1]	8	1	23	14	6	0	9	8
Illinois [1]	32	9	90	99	5	2	40	21
Michigan	24	4	104	73	1	1	12	14
Wisconsin	10	0	30	56	1	1	3	2
West North Central States:								
Minnesota	5	0	19	22	7	2	0	1
Iowa [1]	8	2	9	19	4	1	6	1
Missouri	16	0	36	23	10	2	34	22
North Dakota	0	0	4	2	6	1	2	0
South Dakota	0	1	5	11	0	0	0	4
Nebraska	14	0	1	8	0	0	0	2
Kansas	13	2	21	71	0	0	10	13
South Atlantic States:								
Delaware	0	0	1	1	0	0	0	0
Maryland [1, 2]	13	0	7	9	0	0	15	8
District of Columbia	1	0	4	2	0	0	6	1
Virginia [1]	4	6	5	6	0	0	37	25
West Virginia [1]	1	2	14	6	1	0	29	12
North Carolina [1, 4]	6	7	28	19	0	0	22	30
South Carolina [4]	2	0	6		0	0	15	10
Georgia [4]	0	2	4	11	0	0	33	37
Florida [4]	2	3	4	5	0	0	1	1
East South Central States:								
Kentucky	2	6	27	10	0	0	50	41
Tennessee [1, 4]	1	20	8	12	0	0	20	54

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 14, 1937, and Aug. 15, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936	Week ended Aug. 14, 1937	Week ended Aug. 15, 1936
East South Central States—Contd.								
Alabama [4]	4	22	2	5	0	0	26	28
Mississippi [3]	11	11	1	1	0	0	13	13
West South Central States:								
Arkansas	10	0	6	3	0	0	23	14
Louisiana [4]	8	0	7	3	0	0	17	27
Oklahoma [5]	23	0	6	3	0	0	44	18
Texas [4]	45	2	34	17	0	1	87	30
Mountain States:								
Montana	1	0	6	7	7	23	5	8
Idaho	0	2	3	3	1	1	2	2
Wyoming [1] [6]	6	0	------	4	0	0	0	3
Colorado	8	2	2	6	0	0	1	1
New Mexico	2	0	3	4	0	0	13	10
Arizona	0	0	1	------	0	0	0	0
Utah [3]	1	0	7	4	1	0	1	0
Pacific States:								
Washington	0	3	5	11	1	0	3	2
Oregon [1]	1	1	5	2	0	0	5	2
California	36	8	22	69	5	2	15	21
Total	455	147	865	979	67	41	730	563
First 32 weeks of year	2,940	1,321	164,040	177,911	7,914	5,904	7,543	6,709

[1] Rocky Mountain spotted fever, week ended Aug. 14, 1937, 26 cases, as follows: Rhode Island, 2, Pennsylvania, 1; Indiana, 1, Illinois, 2, Iowa, 1, Maryland, 2, Virginia, 7, West Virginia, 1; North Carolina, 2; Tennessee, 4, Wyoming, 2; Oregon, 1.
[2] New York City only
[3] Week ended earlier than Saturday
[4] Typhus fever, week ended Aug. 14, 1937, 69 cases, as follows: North Carolina, 2; South Carolina, 2; Georgia, 27; Florida, 1, Tennessee, 2, Alabama, 24, Louisiana, 1, Texas, 10.
[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa
[6] Colorado tick fever, week ended Aug. 14, 1937, Wyoming, 1 case.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
April 1937										
Wisconsin	4	12	205	-------	106	-------	-------	1,249	26	7
May 1937										
Virginia	38	38	395	25	2,559	27	3	62	0	31
June 1937										
Arkansas	2	9	27	303	20	119	14	37	0	45
Wisconsin	4	22	77	-------	255	-------	3	713	13	6
July 1937										
California	18	86	36	18	229	15	90	282	22	63
Colorado	4	14	2	-------	146	-------	7	35	4	7
Connecticut	-------	27	2	-------	157	-------	4	68	0	9
New Jersey	5	22	5	3	928	-------	7	109	0	16
North Carolina	11	43	-------	52	379	91	30	63	1	106
Pennsylvania	24	75	-------	-------	2,739	4	8	709	0	88
West Virginia	13	21	46	3	168	-------	19	79	4	54

Summary of Monthly Reports from States—Continued

	Cases
April 1937	
Wisconsin:	
Chicken pox	2,279
German measles	71
Mumps	790
Ophthalmia neonatorum	1
Septic sore throat	42
Tracoma	4
Tularaemia	1
Undulant fever	5
Whooping cough	600
May 1937	
Virginia:	
Chicken pox	284
Dysentery and diarrhea	117
Encephalitis, epidemic or lethargic	1
Mumps	566
Paratyphoid fever	2
Rocky Mountain spotted fever	5
Septic sore throat	10
Undulant fever	4
Whooping cough	589
June 1937	
Chicken pox:	
Arkansas	21
Wisconsin	2,283
Dengue. Arkansas	2
Encephalitis, epidemic or lethargic: Arkansas	2
German measles: Wisconsin	99
Mumps:	
Arkansas	12
Wisconsin	471
Septic sore throat: Wisconsin	23
Tularaemia: Wisconsin	1
Undulant fever:	
Arkansas	4
Wisconsin	4
Whooping cough:	
Arkansas	107
Wisconsin	709
July 1937	
Actinomycosis: California	2
Chicken pox:	
California	567
July 1937—Continued	
Chicken pox—Continued.	
Colorado	20
Connecticut	164
New Jersey	254
North Carolina	68
Pennsylvania	810
West Virginia	87
Dysentery:	
California (amoebic)	8
California (bacillary)	61
Colorado (amoebic)	1
Connecticut (amoebic)	1
Connecticut (bacillary)	5
New Jersey (bacillary)	2
North Carolina (bacillary)	1
West Virginia	3
Encephalitis, epidemic or lethargic:	
California	7
Connecticut	1
New Jersey	3
Pennsylvania	4
Food poisoning California	121
German measles:	
California	34
Connecticut	10
New Jersey	68
North Carolina	20
Pennsylvania	430
Granuloma, coccidioidal: California	2
Jaundice (epidemic): California	2
Leprosy:	
California	1
West Virginia	1
Mumps:	
California	567
Colorado	20
Connecticut	109
New Jersey	179
Pennsylvania	929
West Virginia	9
Ophthalmia neonatorum:	
Connecticut	3
New Jersey	5
North Carolina	2
Pennsylvania	4
Paratyphoid fever:	
California	6
Connecticut	3
North Carolina	4
July 1937—Continued	
Rabies in animals:	
California	157
Connecticut	5
New Jersey	5
West Virginia	11
Relapsing fever: California	4
Rocky Mountain spotted fever:	
Colorado	2
New Jersey	1
North Carolina	11
Pennsylvania	1
Septic sore throat:	
California	3
Connecticut	14
North Carolina	3
West Virginia	1
Tetanus.	
California	6
Connecticut	1
New Jersey	1
Trachoma:	
California	23
Connecticut	1
New Jersey	2
Trichinosis: California	1
Tularaemia: California	4
Typhus fever:	
California	1
Colorado	7
North Carolina	10
Undulant fever:	
California	24
Colorado	1
Connecticut	6
New Jersey	5
North Carolina	5
Pennsylvania	4
Vincent's infection: Colorado	1
Whooping cough:	
California	1,401
Colorado	130
Connecticut	87
New Jersey	363
North Carolina	1,165
Pennsylvania	1,579
West Virginia	399
Yaws: California	1

PLAGUE INFECTION IN FLEAS IN CALIFORNIA, NEVADA, AND UTAH

CALIFORNIA

Dr. W. M. Dickie, Director of Public Health of California, under date of August 9, 1937, states that plague infection has been demonstrated in seven pools of fleas, taken from rodents in San Bernardino County, Calif., as follows:

44 fleas collected on July 14, 1937, from 11 *beecheyi* squirrels.
6 fleas collected on July 13, 1937, from 7 *fisheri* squirrels.
12 fleas collected on July 13, 1937, from 76 white-footed mice.
5 fleas collected on July 13, 1937, from 6 wood rats.
78 fleas collected on July 13, 1937, from 102 chipmunks.
194 fleas collected on July 12, 1937, from 74 golden-mantled squirrels.
52 fleas collected on July 16, 1937, from 13 *beecheyi* squirrels.

The report also stated that five pools of fleas, fleas and ticks, and fleas, ticks, and lice, collected from *beecheyi* squirrels in San Mateo

County in September 1936, and stored in an icebox until July 1937, had been proved positive for plague.

NEVADA

Senior Surgeon C. R. Eskey, in charge of plague suppressive measures, San Francisco, Calif., under date of August 9, 1937, reports plague-infected fleas found in Nevada as follows:

Ormsby County:

96 fleas collected on July 28, 1937, from 46 chipmunks (*Eutamias frater*).

Douglas County:

108 fleas collected on July 29, 1937, from 55 chipmunks (*Eutamias frater*).
318 fleas collected on July 31, 1937, from 200 chipmunks (*Eutamias frater*).

UTAH

Under date of August 10, 1937, Surgeon Eskey reported the demonstration of plague infection, by animal inoculation and cultures, in 25 fleas collected from 2 ground squirrels (*Citellus grammurus*) one-half mile east of Morgan, Morgan County, Utah.

SMALLPOX ON VESSEL AT NEW YORK, N. Y.

A case of smallpox in an American citizen occurred on board the British S. S. *Northern Prince*, which arrived at New York, N. Y., on August 19, 1937. The vessel left Rio de Janeiro on August 5, and the disease developed en route. The patient had been traveling in Brazil and had spent several weeks in Sao Paulo. Appropriate preventive measures were taken.

WEEKLY REPORTS FROM CITIES

City reports for week ended Aug. 7, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	115	41	12	498	290	303	5	372	104	1,277	-------
Current week	75	12	7	380	310	267	2	374	63	1,278	-------
Maine:											
Portland	0	------	0	0	0	0	0	0	0	1	18
New Hampshire:											
Concord	0	------	0	0	1	0	0	0	0	0	13
Manchester	0	------	0	0	0	0	0	1	0	0	12
Nashua	0	------	------	0	------	0	0	------	0	0	2
Vermont:											
Barre	0	------	0	0	0	0	0	0	0	0	1
Burlington	0	------	0	0	0	0	0	0	0	0	9
Rutland	0	------	0	0	0	0	0	0	0	4	6
Massachusetts:											
Boston	1	------	0	6	12	7	0	5	0	32	170
Fall River	0	------	0	1	0	1	0	2	0	11	33
Springfield	0	------	0	1	0	1	0	1	0	11	35
Worcester	0	------	0	0	3	1	0	2	1	3	53
Rhode Island:											
Providence	0	3	0	1	0	2	0	3	0	24	49
Connecticut:											
Bridgeport	0	------	0	0	0	4	0	2	1	0	31

City reports for week ended Aug. 7, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths all causes
		Cases	Deaths								
Connecticut—Con.											
Hartford	1		0	2	1	3	0	2	0	8	35
New Haven	0		0	0	1	0	0	1	0	1	42
New York:											
Buffalo	0		0	0	4	2	0	5	0	0	121
New York	19	3	1	61	63	20	0	77	9	153	1,205
Rochester	0		0	1	0	0	0	1	0	6	52
Syracuse	0		0	1	0	1	0	0	0	23	35
New Jersey:											
Camden	0		0	0	3	0	0	0	3	1	22
Newark	0		0	1	3	3	0	9	0	24	92
Trenton	0		0	12	1	0	0	3	0	0	28
Pennsylvania:											
Philadelphia	2	1	1	6	14	15	0	24	5	44	359
Pittsburgh	1		0	32	17	7	0	13	0	35	169
Reading	0		0	3	1	1	0	1	0	0	21
Scranton	1			0		0	0		0	2	
Ohio:											
Cincinnati	3		1	14	3	4	0	7	0	47	169
Cleveland	4		0	38	9	13	0	9	2	56	156
Columbus	0		0	11	2	2	0	4	2	11	76
Toledo	1		0	8	1	0	0	2	1	33	81
Indiana											
Anderson	0		0	5	3	1	0	0	0	3	16
Fort Wayne	0		0	1	1	0	0	1	0	0	25
Indianapolis	0		0	4	0	1	0	4	0	15	84
Muncie	1		0	2	0	0	0	0	1	0	9
South Bend	0		0	0	1	0	0	0	0	0	16
Terre Haute	1		0	0	0	0	0	0	0	0	17
Illinois.											
Chicago	6		1	57	18	44	0	47	3	78	634
Elgin	0		0	2	0	0	0	0	0	2	4
Moline	0		0	0	0	1	0	0	0	2	12
Springfield	0		0	2	1	0	0	0	0	11	15
Michigan:											
Detroit	6		0	33	5	43	0	14	2	64	221
Flint	0		0	1	2	4	0	1	1	6	29
Grand Rapids	0		0	4	1	2	0	0	0	24	34
Wisconsin:											
Kenosha	0		0	0	0	2	0	0	0	0	7
Milwaukee	0		0	17	2	5	0	4	1	56	
Racine	0		0	0	0	1	0	1	0	0	8
Superior	0		0	0	0	1	0	0	0	0	6
Minnesota:											
Duluth	0		0	0	0	4	0	1	0	6	16
Minneapolis	0		0	2	5	4	0	1	2	17	93
St. Paul	0		0	0	4	1	0	0	0	33	36
Iowa:											
Davenport	0			0		0	0		0	0	
Des Moines	0		0	0	2	7	0	1	1	0	28
Sioux City	0			0		1	0		0	0	
Missouri:											
Kansas City	0		0	2	3	5	0	6	1	2	98
St. Joseph	0		0	0	1	0	0	0	0	2	18
St. Louis	3		0	10	7	18	0	9	4	15	189
North Dakota:											
Fargo	0		0	0	0	0	0	0	0	12	5
Grand Forks	0			0		0	0		0	5	
Minot	0		0	0	0	1	1	0	0	0	2
South Dakota:											
Aberdeen	0			0		0	0		0	0	
Sioux Falls	0			0		0	0		0	0	
Nebraska:											
Omaha	0		0	0	1	2	1	2	1	1	62
Kansas:											
Lawrence	0		0	2	0	1	0	0	0	5	4
Topeka	0		0	0	2	0	0	0	1	7	13
Wichita	0		0	1	6	0	0	0	0	9	26
Delaware:											
Wilmington	0		0	0	3	0	0	1	1	5	26
Maryland:											
Baltimore	2	0	0	5	10	3	0	17	1	105	199
Cumberland	0		0	0	0	0	0	0	0	1	11
Frederick	0		0	0	0	0	0	1	0	0	5
Dist. of Col.:											
Washington	3		0	3	9	1	0	10	2	15	149

City reports for week ended Aug. 7, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Virginia:											
Lynchburg	0		0	0	0	1	0	2	0	2	8
Norfolk	4		0	3	2	0	0	1	0	4	29
Richmond	0		0	6	5	1	0	2	0	0	48
Roanoke	0		0	0	0	0	0	1	3	3	9
West Virginia:											
Charleston	0		0	0	0	0	0	0	0	0	11
Huntington	0			0		0	0		0	0	
Wheeling	0		0	2	2	3	0	1	0	11	20
North Carolina:											
Gastonia	0			0		0	0		0	0	
Raleigh	0		0	0	2	0	0	0	0	2	14
Wilmington	0		0	0	1	0	0	0	0	12	8
Winston-Salem	0		0	0	2	1	0	0	0	16	13
South Carolina:											
Charleston	1	2	0	0	2	3	0	1	0	0	23
Florence	0		0	0	0	0	0	1	0	0	13
Greenville	0		0	0	1	0	0	0	0	0	
Georgia:											
Atlanta	4		0	0	6	1	0	3	1	35	73
Brunswick	0		0	0	0	0	0	0	0	0	3
Savannah	0		0	0	1	0	0	0	0	0	23
Florida:											
Miami	0		0	0	1	1	0	2	1	0	30
Tampa	0	1	0	2	0	0	0	1	0	2	24
Kentucky:											
Ashland	0		0	1	1	0	0	0	7	0	15
Covington	0		0	1	1	0	0	0	0	13	15
Louisville	0		0	5	2	9	0	3	2	58	83
Tennessee:											
Knoxville	2		0	1	2	0	0	1	1	2	26
Memphis	0		0	4	2	0	0	1	1	9	75
Nashville	0		1	0	1	0	0	0	0	7	50
Alabama:											
Birmingham	1		0	1	4	0	0	5	1	3	61
Mobile	1		0	0	2	0	0	1	0	0	35
Montgomery	2	1		0		0	0		0	0	
Arkansas:											
Fort Smith	0			0		1	0		0	2	
Little Rock	0		0	0	4	0	0	1	0	0	7
Louisiana:											
Lake Charles	0		0	0	0	0	0	0	0	0	4
New Orleans	3		0	1	9	2	0	9	6	13	146
Shreveport	1		0	0	4	0	0	1	0	0	39
Oklahoma:											
Muskogee	0		0	0	0	0	0	0	2	0	1
Oklahoma City	0		0	0	1	1	0	0	2	0	35
Tulsa	1	1		0		0	0		1	20	
Texas:											
Dallas	0		0	2	1	2	0	3	2	22	75
Fort Worth	0		2	0	2	1	0	0	3	5	44
Galveston	0		0	0	1	0	0	3	0	0	19
Houston	0		0	4	2	0	0	1	2	6	63
San Antonio	0		0	0	9	0	0	10	1	1	75
Montana:											
Billings	0		0	0	1	0	0	0	0	0	11
Great Falls	0		0	0	0	1	0	0	0	6	2
Helena	0		0	0	0	0	0	0	0	0	3
Missoula	0		0	0	0	1	0	0	0	0	7
Idaho:											
Boise	0		0	0	0	0	0	0	1	0	10
Colorado:											
Colorado Springs	0		0	0	1	2	0	3	0	2	10
Denver	3		0	11	3	7	0	2	0	10	63
Pueblo	0		0	5	3	0	0	2	0	0	14
New Mexico:											
Albuquerque	0		0	2	2	0	0	1	0	0	20
Utah:											
Salt Lake City	0		0	3	2	2	0	0	0	5	21
Washington:											
Seattle	1		1	2	1	1	0	8	0	19	83
Spokane	0		0	2	2	0	0	1	0	9	37
Tacoma	0		0	0	1	0	0	1	0	5	29

City reports for week ended Aug. 7, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Oregon:											
Portland	0		0	2	3	7	2	5	2	1	71
Salem	0			0		0	0		0	8	
California:											
Los Angeles	7	2	1	2	9	8	1	15	1	60	277
Sacramento	0		0	0	2	1	0	1	0	10	23
San Francisco	1		0	0	6	4	0	7	1	35	138

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases	State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Maine:				Maryland:			
Portland	0	0	1	Baltimore	0	0	2
Massachusetts:				District of Columbia:			
Boston	2	1	7	Washington	2	0	0
Worcester	0	0	1	North Carolina:			
New York:				Winston-Salem	0	1	0
Buffalo	0	1	0	Georgia:			
New York	5	1	6	Atlanta	1	0	0
Pennsylvania:				Kentucky:			
Philadelphia	0	0	4	Louisville	0	0	2
Pittsburgh	0	0	2	Tennessee:			
Ohio:				Memphis	0	0	1
Cincinnati	0	0	11	Arkansas:			
Cleveland	0	0	5	Little Rock	0	0	2
Columbus	0	0	2	Louisiana:			
Indiana:				New Orleans	1	0	1
Indianapolis	1	0	0	Shreveport	0	0	3
Muncie	0	0	4	Oklahoma:			
Illinois:				Oklahoma City	0	0	2
Chicago	3	0	13	Texas:			
Michigan:				Dallas	1	0	6
Detroit	0	0	15	Fort Worth	0	0	2
Wisconsin:				Houston	0	0	1
Milwaukee	0	0	5	San Antonio	1	0	0
Minneapolis	0	0	4	Montana:			
Iowa:				Missoula	0	0	1
Des Moines	0	0	2	Colorado:			
Sioux City	0	0	2	Colorado Springs	0	0	1
Missouri:				Denver	0	0	2
Kansas City	0	0	7	Oregon:			
St. Louis	0	0	4	Portland	0	0	1
Nebraska:				California:			
Omaha	0	0	7	Los Angeles	0	0	8
Kansas:							
Wichita	0	0	1				

Encephalitis, epidemic or lethargic.—Cases: Philadelphia, 1; Cleveland, 1; Omaha, 1.

Pellagra.—Cases: Philadelphia, 1; Chicago, 1; Winston-Salem, 1; Nashville, 1; Montgomery, 1; New Orleans, 1; Dallas, 1.

Rabies in man.—Deaths: New Orleans, 1.

Typhus fever.—Cases: Savannah, 1; Miami, 2; Fort Worth, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended July 31, 1937.—During the 2 weeks ended July 31, 1937, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis					1					1
Chicken pox		1		54	92	13	60	22	20	262
Diphtheria		2	1	43	18	3	1	1		69
Dysentery					1					1
Erysipelas					2				3	5
Influenza		4	1	2	16					23
Measles		19	7	178	518	71	50	93	29	965
Mumps		11			88	3	1	4	21	128
Paratyphoid fever					6					6
Pneumonia		1			7		1		3	12
Poliomyelitis		4	1	3	28	5	4	1		46
Scarlet fever		5	3	69	114	15	24	42	16	288
Smallpox								1		1
Trachoma						1			5	6
Tuberculosis	10	24	31	102	94	16	78	2	31	388
Typhoid fever			5	9	8		4	5	2	33
Undulant fever						2			1	3
Whooping cough		10	3	337	186	112	28	2	28	706

CZECHOSLOVAKIA

Communicable diseases—May 1937.—During the month of May 1937, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	5		Paratyphoid fever	16	
Cerebrospinal meningitis	15	4	Poliomyelitis	10	3
Chicken pox	284		Puerperal septicemia	26	9
Diphtheria	1,651	80	Scarlet fever	1,785	21
Dysentery	6		Trachoma	75	
Influenza	35	2	Tularaemia	7	
Lethargic encephalitis	4	3	Typhoid fever	307	24
Malaria	634		Typhus fever	3	1

ITALY

Communicable diseases—4 weeks ended May 23, 1937.—During the 4 weeks ended May 23, 1937, cases of certain communicable diseases were reported in Italy as follows:

Disease	Apr. 26-May 2		May 3-9		May 10-16		May 17-23	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	1	1	15	14	8	8	14	13
Cerebrospinal meningitis	26	25	22	21	29	23	28	21
Chicken pox	485	182	448	161	480	171	544	184
Diphtheria	470	228	397	207	403	217	408	201
Dysentery	11	8	5	5	7	5	13	9
Hookworm disease	14	8	12	6	11	7	13	7
Lethargic encephalitis	2	2	3	3	1	1	2	2
Measles	1,853	334	1,637	343	1,613	355	1,603	356
Mumps	487	128	361	113	324	102	352	115
Paratyphoid fever	41	37	46	32	39	31	43	37
Poliomyelitis	28	26	34	23	41	33	32	25
Puerperal fever	30	30	24	22	30	28	40	39
Scarlet fever	381	131	414	137	392	126	417	151
Typhoid fever	219	151	205	143	240	156	213	141
Undulant fever	127	93	124	86	134	91	130	84
Whooping cough	676	176	525	177	625	171	735	170

TURKEY

Istanbul—Typhoid fever.—According to information dated July 29, 1937, an epidemic of typhoid fever has appeared in Istanbul, Turkey. During the period June 1–15, 1937, 120 new cases of typhoid fever, with 2 deaths, were officially reported. According to unofficial reports, 371 cases of typhoid fever occurred in Istanbul during June 1937, and for the period June 1 to July 22, 1937, 797 cases were reported.

YUGOSLAVIA

Communicable diseases—4 weeks ended July 18, 1937.—During the 4 weeks ended July 18, 1937, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	45	2	Paratyphoid fever	39	
Cerebrospinal meningitis	22	5	Poliomyelitis	5	
Diphtheria and croup	399	30	Scarlet fever	229	
Dysentery	197	12	Sepsis	4	1
Erysipelas	173	4	Tetanus	56	16
Leprosy		1	Typhoid fever	384	29
Lethargic encephalitis		1	Typhus fever	77	2
Measles	83	2			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan-American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Dec. 27, 1936–Jan. 30, 1937	Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Week ended—												
						May 1937					June 1937				July 1937			
						1	8	15	22	29	5	12	19	26	3	10	17	24
China:																		
Canton.[1]																		
Hoihow	C																100	
Hong Kong.[2]																		
Federated Malay States	C														2			
India	C	20,182	7,736	13,015	17,023	2,612	2,860	2,558	3,036	3,083	3,219	3,050	2,508					
	D	11,282	4,305	6,488	8,324	1,407	1,533	1,370	1,511	1,545	1,611	1,526	1,179					
Assam	C	585	197	394	1,823	706	554	503	451	310	258	104	49	24	13	21	14	9
	D	330	80	161	728	289	255	266	248	147	162	72	30	10	7	8	12	5
Bassein	C		8	37	86	46	34	12	4	1	2	3	1					1
Bombay Presidency	C	646	253	98	557	256	613	687	871	832	583	451	334	345	288	406	474	840
	D	249	142	84	237	121	282	338	346	370	209	183	146	136	122	136	180	304
Bombay	C				[3] 1	[3] 1	[3] 1										[3] 1	
Calcutta	C	88	87	106	247	94	136	136	231	135	86	31	35	21	13	17	21	
Central Provinces and Berar	C	125		4	5	5	17	23	21	17	50	97	123	48	16	22	13	26
Chittagong	C	3	2	3	13	[3] 1	16	32	43	51	21	7	6		[3] 1	3		[3] 1
Madras Presidency	C	10,652	4,516	3,186	3,270		494	494	534	516	629	419						
	D	5,712	2,514	1,559	1,855		282	263	309	249	331	213						
Madras	C	75	25	5	5					1	3	2	1				1	1
	D	41	14	1	1						1	2						1
Negapatam	C	22	4	2				1		1	3			17				
	D	13	1								2			10	1			
Northwest Frontier Province	C																	
Orissa Province	C	889	609	602	368	91	38	29	15	8		39	73	76	62	56	59	60
Punjab	C			1	2	2			1			3	6	7	6	10	4	
Rangoon	C	1	4	3	6	4	4		1	3	[3] 1	[4] 4	1	1				
Sind State	C							1										
Tuticorin	C					[3] 2					4	6						

[1] During the week ended July 31, 1937, 40 cases of cholera were reported in Canton, China.
[2] During the week ended July 31, 1937, 7 cases of cholera with 7 deaths were reported in Hong Kong, China.
[3] Imported.
[4] Includes 3 imported cases.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 27, 1936–Jan. 30, 1937	Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Week ended—												
						May 1937					June 1937				July 1937			
						1	8	15	22	29	5	12	19	26	3	10	17	24
India (French):																		
Chandernagor Territory	C	9		3	5	1			2	5	2				1	1		
Karikal Province	C	96	16	3														
Pondichery Province	C		13	1			1											
Indochina (see also table below): Cochinchina—																		
Chaudoc	C			P														
Cholon Province	C	1			P													
Philippine Islands: Manila	C				1													
	D				1													
Siam:																		
Bangkok	C	150	163	226	948	178	84	33	23	20	13	9	4	2		1	1	2
Provinces	C	855	1,339	1,485	1,646	286	213	146	104	47	50	72	81	52	36	55	35	18
Straits Settlements: Penang	C												1					
On vessels:																		
S. S. *Kedah* at Singapore from Penang	C				1													
S. S. *Hellas* at Bangkok from Swatow	C				3													
	D				2													
S. S. *Kedah* at Belawan-Deli	C				1													
S. S. *Filenga* at Penang from Negapatam	C										15							
	D										9							
S. S. *Aronda* at Rangoon from Calcutta	C										1							
S. S. *Badahur* at Rangoon from Calcutta	C											1						
S. S. *Talamba* at Port Swettenham from Madras	C														2			
S. S. *Chungking* at Bangkok from Hoihow	C																1	
S. S. *Kiangsu* at Singapore from Hong Kong	C																	1

Place		December 1936			January 1937			February 1937			March 1937			April 1937			May, 1-10, 1937
		1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31	1-10	11-20	21-30	
Indochina (French) (see also table above):																	
Combodia [5]	C	1									2	6			2		3
	D	1									2	6			2		1
Cochinchina [5]	C		1				1				2				1		
	D		1				1				2				1		

[5] Reports incomplete.

PLAGUE [1]

Place		Dec. 27, 1936-Jan. 30, 1937	Jan. 31-Feb. 27, 1937	Feb. 28-Mar. 27, 1937	Mar. 28-Apr. 24, 1937	Week ended— May 1937					June 1937				July 1937			
						1	8	15	22	29	5	12	19	26	3	10	17	24
Algeria: Algiers	C															[2] 1	[2] 1	
Argentina. (See table below.)																		
Bolivia. (See table below.)																		
Brazil. (See table below.)																		
British East Africa:																		
Kenya	C	20	7	4	5			1	5	1		2	3	19	18	7	10	
Tanganyika	C		84	10	29	1	3	3	3	1	3	2	1					
Uganda	C	36	32	41	24	5	4	4	8	27	6	8	12	13	8	16	6	
	D	34	32	35	22	3	5	3	7	25	5	8	12	13	8	14	6	
Ceylon:																		
Central Province—Nuwara Eliya District	C											1						
Chilaw District	C									1								
Colombo	C	3	10	6		1			1		1		1					
	D	3	9	6		1			1		1		1					
Plague-infected rats		12	17	3	2	1					1	2			1			
China:																		
Amoy	C				2													
Fukien Province [3]	D				130													
Hainan Island	C			P														
Hsiatangchi [4]																		

[1] Including plague in the United States and its possessions.
[2] Suspected.
[3] Under date of June 1, estimated deaths from plague in Province of Fukien, China, reported to be 3,000 to 4,000.
[4] Information dated May 10, states that several hundred deaths from bubonic plague had been reported in Hsiatangchi, China.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 27, 1936–Jan. 30, 1937	Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Week ended— May 1937 1	8	15	22	29	June 1937 5	12	19	26	July 1937 3	10	17	24
Dutch East Indies:																		
Java and Madura	C	583	568	443	259	50	59											
	D	577	569	443	255	50	59											
Java—Batavia	C				[5] 1													
Ecuador (see also table below):																		
Babahoyo	C	3	1															
Guayaquil	C	17	26	33	17	5	3						4					
	D	11	11	24	16	2		1					1	2	1			
Plague-infected rats		10	16	33	37	4	5	10	8		6	5	2			1		
Playas	C	1																
Egypt:																		
Asyut Province	C	2	1	2	48	7	1	1			1							
Dakahliya Province	C				1													
Girga Province	C			1	1	2		1						1				
Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua District:																		
Hamakua Mill Sector				1														
Honokaa Sector [6]																		1
Kukaiau		1																
Paauhau Sector		9	6	5	4	2		2					3	4		4		
Pohakea				1														
India	C	5,118	4,931	5,980	6,094	1,039	527	467	296	173	112	65	72					
	D	2,006	2,528	2,976	3,467	659	362	309	233	127	65	55	39					
Bassein	C	3	7	5	8	2		4		1		3		3			1	
Plague-infected rats			1	2	2			2				1	1					
Bombay Presidency	C	139	120	83	68	19	5	4	2	5	10	3	7	4	3	5	14	11
	D	86	62	40	37	8	4	1	1	2	3	1	3	2	3	2	10	5
Central Provinces and Berar	C	2,022	1,614	2,213	1,103	182	71	58	39	13			7			10		
Karachi	C		7	3	5	1												
Plague-infected rats					1													
Madras Presidency	C	97	94	97	53		8	1	8	6	2	4						
	D	55	57	54	30		4		6	2	1	2						
Punjab	C			1	1	1	1											
Rangoon	C	3	1	1	3	1			1							[5] 1		[5] 1
Sind State	C		6	4	6	1		1										

Indochina (see also table below):																		
Beatre	C	1																
Sadec	C															1		
Madagascar. (See table below.)																		
Malta	C	6			1				4									
	D	1																
Plague-infected rats		1																
Northern Rhodesia	C	8	1															
Peru. (See table below.)																		
Senegal:																		
Dakar	C				1						1					1		
Thies	C							2			1		2	1				
Tivaouane	C					1										1		
Syria: Ras el Ain region	D										[7] 12							
Tunisia: Tunis	C								1								1	1
Plague-infected rats		1			17		5									1		
Union of South Africa (see also table below)	C	[8] 2	4	3	[8] 1													
United States:[6]																		
California:[9]																		
Placer County—Plague infected fleas.																		
San Bernardino County—Plague infected fleas.																		
San Mateo County—Plague infected fleas, lice, and ticks.																		
Idaho[9]—Bannock County—Plague infected ground squirrels														(10)				
Montana—Beaverhead County—Plague infected ground squirrel																		1
Nevada[9]—																		
Douglas County	C											1						
Ormsby County—Plague infected fleas.																		
Oregon:[9]—																		
Grant County—Plague infected ground squirrel								1										
Lake County—Plague infected fleas.																		
Wallowa County—Plague infected ground squirrels										1				1				
Utah[9]—Morgan County—Plague infected fleas.																		
Washington[9]—Adams County—Plague infected fleas and lice.																		
On vessel: S. S. *Magister* at Kingston from Maranhao, Para, and Manaos	C			1														

[5] Imported.
[6] During the week ended July 31, 1937, 2 plague-infected rats were reported in Honokaa Sector, Hamakua District, island of Hawaii, Hawaii Territory.
[7] Pneumonic plague.
[8] For 2 weeks.
[9] Plague infection proved in insect hosts as follows: *California*—Placer County, June 22. San Bernardino County, July 12-16; San Mateo County, July 1937. *Idaho*—Bannock County, July 8. *Nevada*—Douglas County, July 29-31; Ormsby County, July 2-28. *Oregon*—Lake County, May 7; Wallowa County, June 25. *Utah*—Morgan County, reported Aug. 10. *Washington*—Adams County, Apr. 29, 1937.
[10] Number unspecified.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place		January 1937	February 1937	March 1937	April 1937	May 1937	June 1937
Argentina:							
Cordoba Province	C			1			
Salta Province	C	2					
Bolivia:							
Chuquisaca Department	C	P	5		[11] 2		
La Paz Department	C					2	
Oruro Department	C				[11] 1		
Potosi Department	C			[11] 3	[11] 1		
Brazil:							
Ceara State	C	1					
Parahyba State	C	4	1				
Pernambuco State	C		2				
Ecuador (see also table above):							
Manabi—							
Bahia	C		4	7	2		
Manta	C		8	12	13		

Place		January 1937	February 1937	March 1937	April 1937	May 1937	June 1937
Indochina (see also table above):							
Cambodia	C			1	4	4	4
Cochinchina	C	1					
Madagascar (central region)	C	[12] 170	[13] 219		57	45	
	D	161	199		57	43	
Peru	C	23	23	28	9	12	4
Cajamarca Department	C			1			
Huancabamba Department	C				3		
Lambayeque Department	C	2	4		1	1	1
Libertad Department	C	15	12	12	4	3	2
Lima Department	C	4	5	1	1	2	1
Lima City	C		1				
Piura Department	C	2	2	14		6	
Union of South Africa (see also table above)	C	2	3	3	1		

[11] Pneumonic plague.

[12] Includes 44 cases of pneumonic plague.

[13] Includes 66 cases of pneumonic plague.

SMALLPOX

Place		Dec. 27, 1936–Jan. 30, 1937	Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Week ended— May 1937: 1	May 8	May 15	May 22	May 29	June 1937: 5	June 12	June 19	June 26	July 1937: 3	July 10	July 17	July 24
Algeria:																		
Algiers Department	C	2					1					1	1					
Oran Department	C			2			3					1						
Southern Territories	C				2													
Angola. (See table below.)																		
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		

Brazil:																		
Bahia	C	14	7	6	15	3	4											
Porto Alegre (alastrim)	D	1			3	1								1				
Recife (alastrim)	C		1	3	1													
Rio de Janeiro	C	3																
British East Africa: Tanganyika	C	382	122	55	72	65		28				57			65			
Canada:																		
Alberta	C	2	[1] 46		[1] 1						[1] 1				[1] 1		[1] 3	
British Columbia	C	[1] 1																
Manitoba	C			[1] 1														
Saskatchewan	C		[1] 1															
Ceylon: Colombo	C		1															
China:																		
Amoy	C	3		3	2	1							1					
Canton	C		4	3	4		1		1									
Dairen	C	2	6	4	8			2					2	3				
Foochow	C	P	P	P	P	P		P			P		P		P			
Hangchow	C	5	3	1	3				1									
Hankow	C	7	5	8	11	1	5	2	1	2	2							
Hong Kong	C	7	5	7	32	7	4	1		4	4	3			1		2	
Macao	C			2														
Nanking	C	2	7	7	3					1		1	1	2				
Shanghai	C	231	127	96	55	8	11	10	12	13	3	6	6	3	10	8	2	8
Swatow	C			3	4		1		2	2		1	1					
Tientsin	C	2	11	5	3	1	3	1	1	1	1	2		1				
Chosen. (See table below.)																		
Colombia: Barranquilla	D	1	3	2	1						1			1				
Dahomey. (See table below.)																		
Dutch East Indies: Java—Surabaya	C	[2] 1																
Ecuador. Guayaquil	C	10	33	73	34	4	6	9	12		20	8	14	6	4	13	9	4
Egypt:																		
Port Said	C				4									1				
Qena Province	C			1														
Eritrea	C		3	103	4					1		2		1			2	
Estonia	C				2													
Finland. (See table below.)																		
France. (See table below.)																		
Gambia:																		
Bathurst	C			[1] 4														
MacCarthy Island	C			4														
Great Britain: England and Wales—																		
Derby	C			2														
Lancaster—Failsworth	C	2																
Ripley	C			1														
Greece: Salonika	C	10	15	18	30	8	8	7	7	7	5					12	12	
Guatemala. (See table below.)																		
Honduras: Puerto Castilla	C				1													
India	C	10,849	13,761	12,592	12,022	2,216	2,427	2,009	2,143	2,111	2,629	2,695	2,168	1,755				
	D	2,740	3,219	3,005	2,557	442	585	468	580	614	755	764	636	570				
Assam	C	212	220	163	204	88	91	75	66	64	71	54	65	48	15	25	15	31
Bassein	C	18																

[1] For 2 weeks.

[2] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 27, 1936–Jan. 30, 1937	Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Week ended— May 1937 1	8	15	22	29	June 1937 5	12	19	26	July 1937 3	10	17	24
India—Continued.																		
Bombay Presidency	C	671	905	782	1,147	318	286	153	262	159	194	98	114	130	82	68	102	
	D	99	146	136	198	60	30	35	64	39	39	20	24	37	35	19	35	
Bombay	C	25	49	63	136	40	34	21	40	30	24	18	23	40	27	22	27	15
	D	17	29	48	68	28	19	14	28	16	16	13	17	26	19	16	16	7
Calcutta	C	29	86	87	57	22	37	20	18	9	6	4	8	3	2	4	5	
	D	12	34	68	51	16	2	14	11	4	5	4	8	2	2	2	3	
Central Provinces and Berar	C	235	299	341	505	130	136	45	84	57	35	65	73	29	17	42	35	22
Chittagong	C	237	208	55	12	1					[2] 2				1	1		
Cochin	C				47	1				2								
Karachi	C	40	49	40	28	12	2	3		2	4		1					
Madras Presidency	C	671	579	632	569		131	107	115	130	75	55						
	D	131	84	118	89		24	21	30	23	18	13						
Madras	C	3	37	24	24	9	11	10	12	7	8	8	11	16	19	14	14	27
Moulmein	C	48	64	48	8							[2] 1						
Northwest Frontier Province	C	125	85	55	49	15	5	1		9	16	6	19	5	32	33	74	9
Orissa Province	C	681	1,049	848	766	128	150	172		170		199	122	136	77	131	74	114
Punjab	C	533	490	552	400	127	55	138	111	82	251	95	159	169	174	140	90	64
Rangoon	C	5	14	5	9	1		1		1				1				
Sind State	C	195	184	143	263	3	58	31		96	40	52	57	105	65	41	75	56
Vizagapatam	C		3	1														
India (French): Chandernagor Territory	C			2														
Indochina (see also table below):																		
Pnom-Penh	C				1				1				1					
Saigon-Cholon	C	2	2															
Tourane	C	3	3	4	3													
Iran	C	11	10		2													
Teheran	C		2	2			1											
Iraq	C	1	1		14	1			1								1	
Baghdad	C					1												
Italian Somaliland	C																1	
Japan:																		
Kobe	C			[2] 1														
Moji	C			1	10	1		1	1									
Osaka	C				1							[2] 1						
Yokohama	C		1		1													

Mexico (see also table below):																		
Chihuahua	C		3													1		
Ciudad Juarez	D																1	
Durango	D	2	1	10	8	2	2			1		2		2				
Guadalajara	D				1		1			1	1							
Mazatlan	C												1		1			
Mexico, D. F	C	7	4	4	10	3	6	13	13	1								
Monterrey	C	2	11	1	3					1							1	
San Luis Potosi	D							1										
Torreon	C	31	7	1	11		3	6	12	1	2	4		6	3	4		
Morocco. (See table below.)																		
Nicaragua: Puerto Cabezas	C		2															
Nigeria	C	300	19	406	188		281					69		42				
Lagos	C		1		1													
Nyasaland. (See table below.)																		
Palestine. (See table below.)																		
Poland	C		1															
Portugal (see also table below):																		
Lisbon	C	2	1	2	1			1			3	1		2	5			1
Oporto	C	1	1											1	1			
Salvador. (See table below.)																		
Siam: Tak Province	C		26	1	7							2	1		1			2
Sierra Leone	C	88	12				2				1							
Freetown	C		1															
Southern Rhodesia	C				1													
Sudan (Anglo-Egyptian)	C	37	75	12	2	7	3		1	2		33	1	5	6			2
Tunisia	C	1	105											4				
Turkey. (See table below.)																		
Uruguay	C		1									2	1					

[1] Imported.

On vessels:

S. S. *Jaldurga* at Rangoon from Gopalpur	1 case	Dec 30, 1936
S. S. *Egra* at Rangoon from Calcutta	1 case	Jan. 4, 1937
S. S. *Tango Maru* at Singapore from Japan	1 death	Jan. 16, 1937
S. S. *Juna* at Rangoon from Penang	1 case	Jan 27, 1937
S. S. *Horai Maru* at Moji from Keelung	2 cases	Jan 28, 1937
S. S. *Tjibadak* at Surabaya from Shanghai	1 case	Jan 28 1937
S. S. *Colorado Springs* at Manila from Shanghai	1 case	Feb 1, 1937
S. S. *Nikko Maru* at Moji from Tsingtao	1 case	Feb. 7, 1937
S. S. *Bhadravati* at Bombay from Vengurla	1 case	Feb 18, 1937
S. S. *Nagasaki Maru* at Nagasaki from Shanghai	1 case	Mar 8, 1937
S. S. *Kiangsu* at Swatow from Bangkok	1 case	Mar. 13, 1937

On vessels—Continued.

S S *Sumatra* at Calcutta	2 cases	Mar. 21, 1937
S. S. *Englestan* at Rangoon from Chittagong	1 case	Mar. 25, 1937
S. S. *Dariken* at Hong Kong	1 case	Mar 31, 1937
S. S *Talma* at Hong Kong	1 case	Apr. 1, 1937
S. S. *Jalagopal* at Rangoon from Chittagong	1 case	Apr. 2, 1937
S. S. *Taksang* at Hong Kong	1 case	Apr. 13, 1937
S. S. *President Hoover* at Yokohama from Honolulu	1 case	Apr. 17, 1937
S S. *Hydri* at Karachi	1 case	Apr. 24, 1937
S S *G G Pasquier* at Singapore from Saigon	1 case	May 7, 1937
S S *Changte* at Thursday Island	1 case	June 26, 1937
S. S. *Northern Prince* at New York from Rio de Janeiro	1 case	Aug. 19, 1937

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		January 1937	February 1937	March 1937	April 1937	May 1937	June 1937
Belgian Congo	C	111	158	283	143	287	
Bolivia	C	28	4	5	25	48	
China. Manchuria—Harbin	C			3	11	4	
Chosen	C	1	41	58	73	27	
Dahomey	C			5	2		
Finland	C	1	1				
France	C			1	1	1	
Guatemala	C	5	2				2
Indochina (see also table above)	C	306	382	505	316	274	273
	D	84	70	97	46	95	50
Mexico (see also table above):							
Aguascalientes State—Aguascalientes	C	1	1		1		
Chihuahua State	C				1		
Colima State	C		2		4		
Jalisco State—Guadalajara	C	1	1		1		
Mexico State	C			1			
Mexico, D. F	C	12		16	13		
Mexico City	D	5	2				
Mexico—Continued.							
Morelos State	C	4					
Nayarit State	C	1					
Nuevo Leon State—Monterrey	C		6				
Puebla State—Puebla	C	1					
Queretaro State	C			3	1		
San Luis Potosi State—San Luis Potosi	C	1	1		1		
Morocco	C	6	6		6	1	1
Nyasaland	C		7		3		
Palestine	C	2	8				
Portugal (see also table above)	C	113	59	27	15	29	
	D	3	6	2	5	1	
Salvador	C				4		
Turkey	C				15	4	1

TYPHUS FEVER

Place		Dec. 27, 1936–Jan 30, 1937	Jan. 31–Feb 27, 1937	Feb. 28–Mar. 27, 1937	Week ended— April 1937: 3	10	17	24	May 1937: 1	8	15	22	29	June 1937: 5	12	19	26	July 1937: 3	10	17
Algeria:																				
Algiers Department	C	71	128	84	16	19	35	26	17	14	30	9	8	2	27	47	3	15	8	34
Algiers	C	1	2	3	2		2		1		1	2			1	1		1	5	5
Constantine Department	C	159	139	225	64	128	70	86	98	47	92	71	109	115		68	33	65	46	23
Bone	C	2	10	3			2	2	1			4	1	11						3
Philippeville	C	6		1					1											

Oran Department	C	10	64	72		2	2	20	1	3			6	8	9	9		4		6
Southern Territories	C	5	9	[1] 2			1						2	1	5	3		3	1	
Arabia: Aden	C			1																
Australia: Sydney	C			1								1								
Bolivia. (See table below.)																				
Bulgaria. (See table below.)																				
Chile	C	401	226	175	39	53	42	20	41				[2] 212							
Concepcion Province	C		18	29	6	2	5	1												
Iquique	C											1			2					
Santiago Province	C		130	69	14	19	16	9	27				[2] 51							
Valparaiso	C	10	10	37	9	14	9	7	2	17	13	28	11	30	22	29	24	17	6	13
China (see also table below):																				
Dairen	C	1																		
Hankow	C	2													1					
Nanking	C									3	1									
Shanghai	C			1						1	2		1	1	2	1		5		
Swatow	C		1															1		
Tientsin	C	1	1	1			1			1	1			1	1	1	3			
Tsingtao	C		2					1	7	4	1									
Chosen (See table below.)																				
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C	10	9	5	1		1	3	4	4	5	3	4	4	1				1	1
Aswan Province	C			7			3	2	4				2							
Asyut Province	C		2	5										5				1	1	2
Beheira Province	C	8	60	18			20	33	24		27		23	14				10	7	5
Beni-Suef Province	C												1							
Cairo	C		4	11	3	1	6	4	4	4	6	2	1	1						
Dakahliya Province	C		25	15			12	26	24		35		15	15				14	10	6
Damietta Province	C													1	1					
Faiyum Province	C	1																		1
Gharbiya Province	C	5	20	12			19	40	40		56		39	55				17	19	1
Girga Province	C												1	2				1	1	
Minufiya Province	C	1	20	6			1	10	6		10		9	4					1	
Minya Province	C	1	21								1		1							
Port Said	C	8	1													1		1	1	
Qena Province	C	1					4	10	26		6		1	3						
Sharkiya Province	C	1		1				2	10				1	3					1	
Suez	C															1				
Provinces	C	114	175	123	21	26	60	123	144	170	150	149	96	106	59	85	57	45	40	17
Eritrea: Asmara	C	14	1			2	2	2	3			1		1	1					
Finland. (See table below.)																				
Greece (see also table below): Salonika	C	1																		
Guatemala. (See table below.)																				
Hawaii Territory: Honolulu	C	5		1	1													1		1
Hungary	C		7	12								1						1		
Iran	C	7	19	11		6	1			4		7	3	15	1		9			
Teheran	C	2	3							1				1						

[1] Imported
[2] For 4 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Dec. 27, 1936–Jan 30, 1937	Jan 31–Feb 27, 1937	Feb. 28–Mar 27, 1937	Week ended— April 1937				May 1937					June 1937				July 1937		
					3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17
Iraq:																				
Baghdad	C	1			[1] 5												1	1		1
Diwaniyeh Province	C									6										
Kirkuk Province	C			12				8		2			1	2	4	6		2		
Kut Province	C					1														
Irish Free State: Kerry County—Caherciveen	C		4		4															
Latvia. (See table below)																				
Libya. (See table below.)																				
Lithuania. (See table below.)																				
Mexico (see also table below):																				
Mexico, D. F.	C	12	20	11	4	4	2	3	4	7	2	3	2							
San Luis Potosi	D	2													1					
Torreon	C					1														
Morocco (see also table below)	C	5	22	24	30	28	23	39	69	65	70	47	101	49	50	38	37	31	15	13
Casablanca	C													200				2		
Palestine:																				
Haifa	C	3	1	1		1			1	1		2	2		1				2	
Jaffa	C	2		2	2	1		1	1		2	1	2		2	1		1		2
Panama Canal Zone. (See table below.)																				
Poland	C	399	485	462	161	169	136	163	158	132	205	199	111	106	76	66	39	30	18	18
	D	22	26	33	9	12	7	12	9	11	10	5	8	5	9	4	2			1
Rumania. (See table below.)																				
Sierra Leone: Freetown	C	1	1							2										
Straits Settlements: Singapore	C	1																		
Syria	C					1										1				
Trans-Jordan	C		3	1		1	2		3				2						1	
Tunisia:																				
Tunis	C	7	5	4		1	3		2	3	9	1	5	3	9	2	5	1	1	1
Provinces	C	214	247	550	79	102	133	114	90	166	133	136	141	93	188	139	126	87	97	106
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia. (See table below.)																				
On vessel: At Santos	C			P																

[1] Imported.

Place		January 1937	February 1937	March 1937	April 1937	May 1937	June 1937
Bolivia	C	24	25	30	48	39	
Bulgaria	C	19					
China: Manchuria—Harbin	C	8	35	58	45	29	
Chosen	C	88	149	154	147	99	
Czechoslovakia	C	15	12	33	25	3	
Finland	C				1		1
Greece (see also table above)	C	7	2	4	2	1	
Guatemala	C	29	19	4	13	12	8
Latvia	C			1	1		
Libya	C					13	34
Lithuania	C	13	10	23	37	6	
Mexico (see also table above):							
Aguascalientes State: Aguascalientes	C	2	3	1	1		
Guanajuato State	C			2			
Hidalgo State	C				5		
Jalisco State—Guadalajara	D			1			
Mexico State	C	8		1			
	D	1		1			

Place		January 1937	February 1937	March 1937	April 1937	May 1937	June 1937
Mexico—Continued							
Mexico, D. F.	C	14	18	12	16		
Mexico City	D	6	6				
Oaxaca State	C		2				
Puebla State: Puebla	C	7	3				
Queretaro State	C	1	2	1	1		
San Luis Potosi State: San Luis Potosi	C	7		2	2		
Morocco (see also table above)	C	11	22	27	190	283	182
Panama Canal Zone	C					2	
Rumania	C	941	1,018	917	832	557	
Turkey	C	24	50	68	39	155	72
Istanbul	C	7	3		3		
Union of South Africa:							
Cape Province	C	52	12	38	41	35	
Natal	C	4	1	1		7	
Orange Free State	C	5	11	5	3	27	
Transvaal	C	13	1	2		1	
Yugoslavia	C	159	125				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Dec. 27, 1936–Jan. 30, 1937	Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Week ended— April 1937				May 1937					June 1937				July 1937			
					3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	17	24
Brazil: [1]																					
Acre Territory	D	1	1																		
Matto Grosso State [1]	C		20	1																	
	D	3	6	3					2	1											
Minas Geraes State [1]	C	1	2																		
	D	1	13	34	3	6	2	2	1												
Para State [1]	D							1											1		
Paraná State	C		2																		
São Paulo State [1]	C	4	1																		
	D	4	14	38	4	5	6	1													
Colombia:																					
Barrancabermeja	C		1																		
Boyaca Department	C												1					1			
	D		1	1									3							2	
Cundinamarca Department	D	2												1							
Intendencia of Meta—Villavicencio	D			1			2	1													
Santander Department	C		1																		
	D	1	1			1	1			1		1									
Dahomey: Bohicon	C																[2] 1				
French Equatorial Africa:																					
Brazzaville	D							1													
Libreville [3]	C			1																	
	D		1																		
Gold Coast [4]	C	6	3	1						2			2		6	3	2	5		10	2
	D												1		1			4		10	2
Accra	C	5	3													1	1	1		1	
Hugo	C												1								
Ivory Coast:																					
Adzope	C		3																		
Agboville	C			1																	
Nigeria:																					
Farcados	C																				1
Ibadan [5]																					

Ogbomosho	C																	3	1		1
	D																	1			1
Ovim.[5]																					
Paraguay.[6]																					
Peru: Perene region (Pampa Whaley)	C				[7] 10	[7] 13															
	D				5	3															
Senegal:																					
Bambey	C																[2] 1				
Dakar	C										[2] 1										
Diakhao	C			1					1												
Linguere	C															[2] 1					
Malem Hodar	C												1								
Thies Circle—Khombole	C					1															
Tilmaka	C					1						1									
Tivaouane	C					1															
Sudan (French): Mahina	C									[2] 1											

[1] See also reports of yellow fever in Brazil on pp. 463, 536, 657, 683, 762, 818, and 912, of the Public Health Reports.
[2] Suspected.
[3] During the week ended July 31, 1937, 1 case of yellow fever with 1 death was reported in Libreville, French Equatorial Africa.
[4] During the week ended Aug. 7, 1937, 6 cases of yellow fever with 4 deaths were reported in the interior of Gold Coast
[5] During the week ended July 31, 1937, 1 case of yellow fever was reported in Ibadan and 1 death from suspected yellow fever at Ovim, Nigeria.
[6] A dispatch dated June 4, 1937, from the United States legation in Asuncion, Paraguay, states that yellow fever has been officially reported in the northwestern part of Paraguay.
[7] Jungle type.

X

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg. Gen. ROBERT OLESEN, *Chief of Division*

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PUBLIC HEALTH REPORTS

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CURRENT PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

July 18–August 14, 1937

The accompanying tables summarize the prevalence of eight important communicable diseases based on weekly telegraphic reports from State Health Departments. The reports from each State are published in the PUBLIC HEALTH REPORTS under the section "Prevalence of Disease." Table 1 gives the number of cases of poliomyelitis reported by each State in recent weeks of 1937 and in corresponding weeks of 1936, 1935, and 1934, and table 2 gives the number of cases of eight important communicable diseases, including poliomyelitis, for the 4-week period ending August 14, the number reported for the corresponding period in 1936, and the median number for the years 1932–36.

DISEASES ABOVE MEDIAN PREVALENCE

Poliomyelitis.—The number of cases of poliomyelitis rose from 771 for the 4 weeks ending July 17 to 1,589 for the current 4-week period. For the corresponding period in 1936, 1935, and 1934 the numbers of cases totaled 515, 1,433, and 1,035, respectively. In 1936 a minor epidemic was in progress at this time in the East South Central region. In 1935 a more severe epidemic started in South Carolina and was confined mostly to the Atlantic seaboard States. In 1934 the disease was epidemic in California and other western States. In 1933 there was a minor outbreak about this time of the year in the North Atlantic regions and a total of 667 cases was reported, while in 1931 a much more severe epidemic was present in the same regions, when there were 2,974 cases reported. In 1932 and 1929 the numbers of cases for this period totaled 395 and 314, respectively.

Table 1 shows for each State the number of cases of poliomyelitis reported since the beginning of the current year, with comparative data for the corresponding period of 3 preceding years. It includes also the weekly number of cases in each State for recent weeks of 1937.

The current epidemic has been confined largely to the South Central and East North Central regions. Of the 3,448 cases reported during the first 33 weeks of 1937, the West South Central region reported 1,006, the East South Central 430, and the East North Central 604

cases, or more than one-half of the total for the country. During these 33 weeks, however, a number of States in other regions reported significant increases over the 3 preceding years— Missouri (110 cases), Kansas (65), Nebraska (64), Georgia (52), Colorado (39), Maine (38), Iowa (35), and Wyoming (12).

TABLE 1.—*Poliomyelitis cases reported in each State during recent weeks of 1937* [1]

Division and State	33 weeks ended—				Cases reported in 1937 for week ended—												
	Aug. 18, 1934	Aug. 17, 1935	Aug. 15, 1936	Aug. 21, 1937	May 29	June 5	June 12	June 19	June 26	July 3	July 10	July 17	July 24	July 31	Aug. 7	Aug. 14	Aug. 21
All States [2]	4,064	3,527	1,341	3,448	21	36	38	69	82	158	256	275	324	401	409	455	492
New England:																	
Maine	9	14	22	38	0	0	0	0	0	1	2	0	4	3	13	8	6
New Hampshire	7	20	3	6	0	0	0	0	0	0	0	1	1	2	0	1	1
Vermont	6	0	9	7	0	0	0	0	0	0	0	1	0	0	0	2	3
Massachusetts	44	279	36	118	0	1	1	8	1	2	8	2	10	13	12	25	41
Rhode Island	1	33	2	3	0	0	0	0	0	0	0	0	0	0	1	2	0
Connecticut	6	91	6	17	0	0	0	0	0	0	2	0	0	2	3	3	6
Middle Atlantic:																	
New York	105	640	76	139	0	4	0	2	3	2	6	10	8	11	17	22	39
New Jersey	40	71	15	40	0	0	0	1	0	2	1	1	1	5	3	6	14
Pennsylvania	50	49	42	67	1	0	1	1	0	1	0	1	0	6	11	14	21
East North Central:																	
Ohio	79	48	30	225	1	2	0	1	2	2	9	14	20	48	38	45	92
Indiana	16	11	11	67	0	0	0	0	1	0	1	8	7	15	7	8	12
Illinois	87	68	79	189	1	0	1	0	1	2	2	8	11	26	28	32	54
Michigan	49	85	32	90	1	1	0	3	0	1	1	2	4	10	14	24	21
Wisconsin	20	20	8	33	1	0	0	1	1	0	1	0	2	2	6	10	6
West North Central:																	
Minnesota	28	22	7	35	0	0	0	0	1	0	0	1	1	1	9	5	10
Iowa	11	19	10	35	0	0	0	0	0	0	0	1	3	3	4	8	7
Missouri	17	16	16	110	0	1	1	1	1	1	22	4	16	16	16	16	13
North Dakota	2	2	6	1	0	0	0	0	0	0	0	0	0	0	0	0	0
South Dakota	17	2	2	5	0	0	0	0	0	0	0	0	0	0	1	0	1
Nebraska	8	8	7	64	0	2	1	0	0	1	0	4	4	11	7	14	15
Kansas	31	12	19	65	0	0	0	1	1	2	3	4	4	7	13	13	13
South Atlantic:																	
Delaware	1	3	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0
Maryland	15	30	7	30	0	0	0	0	0	0	0	0	1	7	8	13	5
District of Columbia	5	29	1	8	0	0	0	0	0	0	0	0	0	1	0	1	3
Virginia	33	528	21	38	0	0	0	3	3	1	3	3	1	5	4	4	1
West Virginia	31	16	18	38	0	0	0	0	0	1	0	2	1	4	12	1	5
North Carolina	30	548	34	69	2	0	1	3	6	7	4	8	9	6	4	6	5
South Carolina	9	21	15	18	0	1	2	0	1	1	0	1	1	1	1	2	0
Georgia	10	12	24	52	0	1	2	0	1	4	6	4	3	2	6	0	5
Florida	14	13	10	17	1	0	0	0	1	0	0	0	0	1	0	2	3
East South Central:																	
Kentucky	38	82	30	93	0	2	0	0	2	2	7	5	18	33	9	2	4
Tennessee	22	48	138	87	1	0	2	9	7	19	11	7	10	6	3	1	1
Alabama	26	40	298	41	1	0	1	4	5	2	4	1	1	1	3	4	2
Mississippi	15	8	45	209	5	9	7	17	18	30	20	20	13	13	8	11	11
West South Central:																	
Arkansas	8	10	4	248	0	1	4	3	7	26	36	36	48	26	16	19	10
Louisiana	11	69	11	72	0	1	2	1	2	7	8	7	7	5	7	8	6
Oklahoma	6	9	6	288	0	0	3	1	8	7	55	46	53	28	30	23	19
Texas	56	42	20	398	1	3	5	6	0	23	36	52	31	42	58	45	51
Mountain: [2]																	
Montana	75	4	6	8	0	0	0	0	0	0	1	0	1	0	2	1	3
Idaho	70	1	9	5	0	0	0	0	0	1	0	0	0	0	0	0	0
Wyoming	2	1	1	12	0	0	0	0	0	0	0	1	1	1	2	6	0
Colorado	9	6	10	39	0	0	0	0	0	1	0	1	3	2	2	8	21
New Mexico	10	5	4	12	0	0	0	0	0	0	1	0	2	0	0	2	1
Arizona	51	6	3	9	0	0	0	0	0	1	2	0	2	1	0	0	0
Utah	4	3	1	2	0	0	0	0	0	0	0	0	0	0	0	1	0
Pacific:																	
Washington	240	20	21	13	0	0	0	0	0	1	0	0	0	0	1	6	8
Oregon	26	5	11	24	0	1	0	2	0	0	0	0	1	1	2	1	3
California	2,614	463	160	253	5	6	4	6	9	7	8	19	21	34	33	36	25

[1] A table showing the distribution of cases by geographic regions for the period May 9 to July 24, 1937, appeared in the Public Health Reports for Aug. 6, 1937, p. 1070.

[2] Exclusive of Nevada, from which State no reports are received.

In the South Central regions, where the epidemic apparently started, the number of cases reported from Mississippi and Arkansas declined definitely during the 3 weeks ended August 21. The disease also appeared to be on the decline in Oklahoma but was still quite prevalent in Texas. In other sections of the country, some States which had been reporting more than the usual number of cases for this season of the year show a lower incidence during the last week for which data are available (August 15–21) than during the preceding weeks, while other States, such as Massachusetts (41 cases), New York (39 cases), Pennsylvania (21 cases), Illinois (54 cases), and Colorado (21 cases) reported the highest incidence for the season during this week.

Meningococcus meningitis.—The number of cases of meningococcus meningitis (250) was about 85 percent of the number reported for the corresponding period in each of the 2 preceding years (287 and 292, respectively). In 1934, 1933, and 1932 the numbers of cases for this period totaled 130, 147, and 157, respectively. The current excess over the years 1932-36 is almost entirely confined to the South Atlantic and South Central regions. In all other sections the incidence of meningitis, which has been relatively high in the country as a whole since the beginning of 1935, has dropped to the level of more normal years.

Smallpox.—The number of cases of smallpox, though showing a seasonal decline, maintained its excess over recent years. With the exception of 11 cases reported from New York, the highest incidence was still confined to States in the North Central, Mountain, and Pacific regions.

Measles.—The incidence of measles was about 30 percent in excess of that for the corresponding period of 1936 but was considerably lower than in the 2 preceding years. Each region, except the New England and Pacific areas, contributed to the current increase over last year. In the East North Central and East South Central regions the incidence was more than 3 times that for this period last year and other regions reported significant increases. In the New England and Pacific regions the current incidence was the lowest for this period in recent years.

Typhoid fever.—For the 4 weeks ending August 14 the mumber of reported cases of typhoid fever was 2,704, as compared with 2,058, 2,895, and 3,760 for the corresponding period in the years 1936, 1935, and 1934, respectively. The current incidence was about 30 percent in excess of that of last year, when the number of reported cases for this period was the lowest on record. Each region, except the New England and Mountain regions, reported an excess of cases over last year. States in which sharp increases occurred are as follows: Arkansas, Illinois, Kansas, Maryland, Missouri, Ohio, Pennsylvania, and Virginia.

TABLE 2.—*Number of reported cases of 8 communicable diseases in the United States during the 4-week period June 20–July 17, 1937, the number for the corresponding period in 1936, and the median number of cases reported for the corresponding period 1932–36* [1]

Division	Current period	1936	5-year median	Current period	1936	5-year median	Current period	1936	5-year median	Current period	1936	5-year median
	Diphtheria			Influenza [2]			Measles [3]			Meningococcus meningitis		
United States [1]	1,158	1,111	1,476	937	727	1,015	8,294	6,488	7,626	250	287	157
New England	60	52	54	8	1	2	400	1,112	958	11	9	9
Middle Atlantic	158	209	253	22	26	18	3,152	2,631	2,847	49	60	39
East North Central	205	211	255	107	128	187	2,571	800	2,006	45	51	51
West North Central	74	91	149	143	71	48	169	128	281	14	14	16
South Atlantic	219	188	265	224	129	320	677	535	732	48	66	17
East South Central	126	97	174	56	97	87	352	104	193	35	47	15
West South Central	192	148	257	261	181	185	317	163	163	25	7	7
Mountain	33	33	34	66	37	28	422	252	252	8	10	6
Pacific	91	82	116	55	57	77	234	763	763	15	23	8
	Poliomyelitis			Scarlet fever			Smallpox			Typhoid fever		
United States [1]	1,589	515	667	3,796	4,442	4,068	357	239	209	2,704	2,058	3,735
New England	105	22	33	200	301	301	0	0	0	39	70	48
Middle Atlantic	104	33	177	747	1,055	1,023	11	0	0	190	141	225
East North Central	357	55	70	1,412	1,425	1,205	60	67	37	276	165	426
West North Central	172	20	86	431	570	303	160	81	63	203	111	275
South Atlantic	102	35	35	286	243	310	6	3	3	613	467	889
East South Central	136	271	41	149	107	173	4	1	1	488	427	777
West South Central	446	5	21	207	160	150	0	2	28	739	526	714
Mountain	37	13	5	135	196	119	71	75	36	55	81	89
Pacific	130	61	61	229	385	389	45	10	65	101	70	70

[1] 48 States. Nevada is excluded and the District of Columbia is counted as a State in these reports.
[2] 44 States and New York City. The median is for the years 1933–36 only; the data for 1932 are not comparable.
[3] 46 States. Mississippi and Georgia are not included.

DISEASES BELOW MEDIAN PREVALENCE

Scarlet fever.—The number of cases of scarlet fever (3,796) was the lowest reported for this period in 7 years; it represented a decrease of about 15 percent from the figure for the corresponding period in 1936 and was about 10 percent below the 1932–36 median. Only the South Atlantic and South Central regions reported an increase over last year; other regions reported very substantial reductions. This disease has been unusually prevalent in the North Central regions for the past 3 or 4 years, and there the current incidence was somewhat above the seasonal expectancy; the incidence in the West South Central region was also slightly above normal for this season of the year.

Diphtheria.—For the second consecutive 4-week period the incidence of diphtheria (1,158 cases) exceeded that for the corresponding period in 1936, again interrupting the steady decline of this disease that has been in progress for several years. The increase was almost entirely due to an excess of cases in the South Atlantic and South Central regions; the figures for other regions closely approximated last year's figures. Compared with the preceding 5-year median the

incidence of diphtheria has been low in the country as a whole and also in each region, except the New England and Mountain areas.

Influenza.—The influenza incidence was slightly higher than at this time in 1936, but the situation was quite favorable for this season of the year. The numbers of cases occurring in the West North Central and West South Central regions were slightly above the seasonal expectancy, but in all other regions the incidence was about normal.

MORTALITY, ALL CAUSES

The average mortality rate for large cities during the 4-week period ended August 14, based on data received from the Bureau of the Census, was 10.2 per 1,000 inhabitants (annual basis). The rates for the corresponding period in the years 1936, 1935, and 1934 were 11.9, 10.0, and 10.5, respectively.

STUDIES IN CHEMOTHERAPY

VI. THE CHEMOTHERAPY OF CHORIOMENINGITIS VIRUS INFECTION IN MICE WITH SULPHONAMIDE COMPOUNDS*

By SANFORD M. ROSENTHAL, *Senior Pharmacologist*, JERALD G. WOOLEY, *Bacteriologist*, and HUGO BAUER, *Research Associate, National Institute of Health*

The chemotherapeutic action of Prontosil was announced 2 years ago by Domagk (*1*), and at that time this action was thought to be highly specific against streptococcal infections. Trefouel, Nitti, and Bovet (*2*) later found that a fraction of the Prontosil molecule, para-aminobenzene sulphonamide (sulphanilamide), was equally capable of curing streptococcal infections. Following this discovery it has been possible to show that sulphanilamide is not limited in action to streptococci, but that it possesses curative effects upon a number of other bacterial infections (*3*) (*4*) (*5*).

There is also evidence suggesting that specific compounds may be developed which exhibit specialized activity against certain types of infection. Thus, in comparisons which were made in mice by Rosenthal, Bauer, and Branham (*6*), sulphanilamide is more effective against streptococci, meningococci and pneumococci than is Prontosil, while a new compound which we developed, di-sulphanilamide, is more effective against streptococci and meningococci, but less effective against pneumococci, than is sulphanilamide.

Upon the basis of evidence just cited, preliminary experiments were undertaken with a number of sulphonamide compounds upon some virus infections in mice. It is of interest that a virus infection has been found which is favorably influenced by drug therapy, and

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that at the present stage of our investigation this activity is shown specifically by Prontosil (4-sulphonamide-2-4′-diamino-azobenzene).[1] No appreciable effects were obtained with the related compounds, Prontosil Soluble, sulphanilamide, or di-sulphanilamide, although these compounds are more active than Prontosil against bacterial infections.

The therapeutic action of Prontosil upon virus infections in mice has so far shown itself to be limited to the virus of choriomeningitis. We have been unable to demonstrate activity upon the virus of encephalitis (St. Louis type) or upon the virus of influenza with any of the sulphonamide compounds studied. Levaditi also obtained negative results with Prontosil upon herpes virus infection in rabbits, and upon the virus of lymphogranuloma inguinale in a monkey (*6*).

TECHNIQUE

The choriomeningitis virus employed was the original strain isolated and described by Armstrong and Lillie (*8*). While the symptoms produced in animals from intracerebral inoculation are referred principally to the central nervous system, this disease has been shown to be a systemic infection in that the virus can be recovered in high titer from the blood and various organs of monkeys (Armstrong, Wooley, and Onstott (*9*)), and also in that the pathologic lesions are widespread (Lillie (*10*)).

The material for inoculation in these experiments represents suspensions in saline of brains removed from mice during the final stages of the disease. Either freshly removed brains were used or those preserved in 50 percent glycerine for a few days. The dilutions of virus represent the dilution of mouse brain, by weight, in 0.85 percent salt solution buffered at pH 7.6. Mice were lightly anesthetized with ether, and under sterile precautions 0.03 cc of this material was inoculated intracerebrally.

The virus is maintained by mouse passage; virulence for mice can usually be increased by passage of the virus through guinea pigs.

Therapy was begun within an hour after inoculation in all cases. The drugs were suspended in olive oil in 20 to 40 percent concentrations, by grinding in a mortar. All injections were made subcutaneously with a tuberculin syringe and a gage 20 needle. Injections were repeated at intervals of 1 to 2 days up to the sixth or seventh day, at which time symptoms of the disease ordinarily manifest themselves. The dosage of the drugs was large, from one-third to two-thirds of the maximum tolerated dose being employed in each case.

We have compared the action of Prontosil, Prontosil Soluble, sulphanilamide, di-sulphanilamide, and chrysoidine R (an azo dye,

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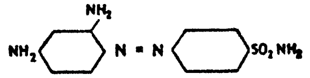
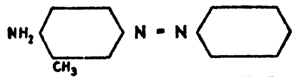
[1] Obtained from Winthrop Chemical Co. This refers to the original Prontosil of Domagk and is not to be confused with the Prontosil Soluble marketed in this country also under the name Prontosil.

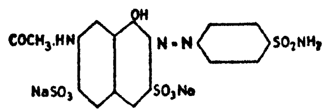
related to Prontosil but containing no sulphamido group). Their chemical relationship is shown by the following formulae:



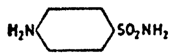
PRONTOSIL



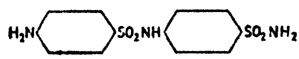
CHRYSOIDINE R



PRONTOSIL SOLUBLE



SULPHANILAMIDE



DI-SULPHANILAMIDE

RESULTS

A preliminary experiment upon a small group of mice showed that Prontosil possessed therapeutic activity, while Prontosil Soluble and sulphanilamide were inactive (experiment 1, table 1). This was confirmed on a larger scale when all of the drugs in the present series were compared. No appreciable curative action was demonstrated for any of them except Prontosil, which in this experiment brought about the survival of 13 out of 15 mice, as compared with 3 survivors out of 25 controls (exp. 2, table 1; also chart 1).

The virus in the above-mentioned experiments was of moderate virulence, a condition which we have found more favorable for the demonstration of chemotherapeutic activity. A further study of the action of Prontosil on the choriomeningitis virus revealed that curative action was less marked when the virus was highly virulent, and that the majority of mice could be saved only when the infective dose of virus was small, approximating a single fatal dose. In every experiment, however, some prolongation of life occurred among the treated animals.

In experiment 3 (table 1) a virus (mouse brain) dilution of 1 to 700 was employed. This represented a high infective dose, as evidenced by the fact that 92 percent of the controls died on the fifth and sixth days. Of the 24 animals treated with Prontosil, one-third survived, while the remainder showed a prolongation of life from 1 to 3 days.

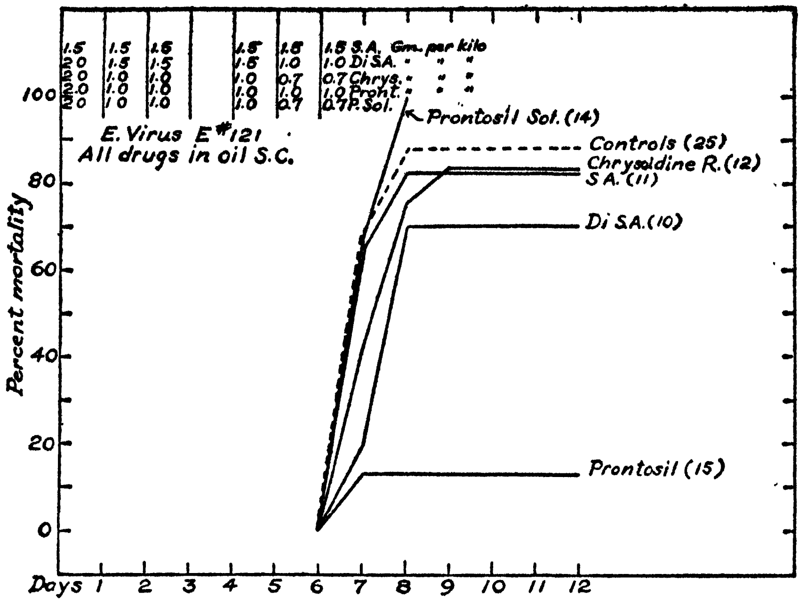


CHART 1.—Comparative results with sulphonamide compounds in choriomeningitis virus infection. Only Prontosil is effective. (Dosage of drugs is shown on the chart. The numbers of mice used are shown in parentheses)

TABLE 1.—*Curative action of Prontosil in choriomeningitis virus infection in mice. The virus was inoculated intracerebrally; drugs were injected subcutaneously, suspended in olive oil*

Experiment no.	Virus dilution	Therapy [1]	Number of mice	Deaths: Day after inoculation 5	6	7	8	9	10	11	12	Mortality, percent
1	1: 2,000	None	5	---	---	5	---	---	---	---	---	100
		Pr. 2 gms/kilo in 1 hr.; 1 gm/kilo on 2d, 3d, 5th days.	5	---	---	2	---	---	---	---	---	40
		Pr. Sol. 1 gm/kilo in 1 hr. and on 2d, 3d, 4th days.	5	---	---	5	---	---	---	---	---	100
		S. A. 1 gm/kilo in 1 hr. and on 2d, 3d, 4th days.	5	---	---	5	---	---	---	---	---	100
2	1: 1,000	None	25	---	---	17	5	---	---	---	---	88
		Pr. 2 gms/kilo in 1 hr.; 1 gm/kilo on 1st, 2d, 4th, 5th, 6th days.	15	---	---	2	---	---	---	---	---	13
		Pr. Sol. 2 gms/kilo in 1 hr.; 1 gm/kilo on 1st, 2d, 4th days; 0.7 gm on 5th and 0th days.	14	---	---	9	5	---	---	---	---	100
		Chrys. 2 gms/kilo in 1 hr.; 1 gm/kilo on 1st, 2d, 4th days; 0.7 gm on 5th, 6th days.	12	---	---	5	4	1	---	---	---	88
		S. A. 1.5 gms/kilo in 1 hr. and on 1st, 2d, 4th, 5th. 6th days.	11	---	---	7	2	---	---	---	---	82
		Di-S. A. 2 gms/kilo in 1 hr.; 1.5 gms/kilo on 1st, 2d, 4th, days; 1 gm/kilo on 5th, 6th days.	10	---	---	2	5	---	---	---	---	70
3	1: 700	None	24	---	22	2	---	---	---	---	---	100
		Pr. 2 gms/kilo in 1 hr.; 1 gm/kilo daily for 5 days.	24	---	2	11	2	---	1	---	---	66

[1] *Pr.* = Prontosil, *Pr. Sol.* = Prontosil Soluble; *Chrys.* = Chrysoidine R; *S. A.* = Sulphanilamide; *Di-S. A.* = Disulphanilamide.

TABLE 1.—*Curative action of Prontosil in choriomeningitis virus infection in mice. The virus was inoculated intracerebrally; drugs were injected subcutaneously, suspended in olive oil*—Continued

Experiment no.	Virus dilution	Therapy	Number of mice	Deaths: Day after inoculation 5	6	7	8	9	10	11	12	Mortality, percent
4	1: 1,000	None	10		10							100
		Pr. 1.5 gms/kilo in 1 hr.; 1 gm/kilo on 1st, 3d, 4th, 5th days.	10		8	2						100
	1: 2,000	None	10		10							100
		Pr. as above	10			9	1					100
	1: 4,000	None	10		10							100
		Pr. as above	10			9						90
	1: 8,000	None	10		7	3						100
		Pr. as above	10			8						80
	1: 16,000	None	10		10							100
		Pr. as above	10			9						90
5	1: 1,000	None	10		6	4						100
		Pr. 2 gms/kilo in 1 hr.; 1 gm/kilo daily for 5 days.	10			9						90
	1: 5,000	None	10		7	3						100
		Pr. as above	10			6	3					90
	1: 25,000	None	10			10						100
		Pr. as above	10			7	3					100
	1: 125,000	None	10			10						100
		Pr. as above	10			2	2	1	1	1		70
	1: 625,000	None	10			1	5	3	1			100
		Pr. as above	10				2	2				40
6	1: 100,000	None	20				1	7		1	2	55
		Pr. 1 gm/kilo in 1 hr. and on 1st, 2d, 4th days	20				1					5

At this time the virus was submitted to passage through guinea pigs to increase its virulence. As a result, the virus became very highly virulent; and in a subsequent experiment with five dilutions of the virus ranging from 1:1,000 to 1:16,000, Prontosil therapy brought about the survival of only 10 to 18 percent of the mice in the groups infected with 1:4,000, 1:8,000, and 1:16,000 dilutions. None survived the 1:1,000 and 1:2,000 dilutions (experiment 4). Some prolongation of life was apparent in all cases. A further experiment employing lower infective doses was accordingly carried out. The virulence was found such that all untreated animals succumbed to a virus dilution of 1:625,000. With this dilution 60 percent of the animals treated with Prontosil survived, while 30 percent survived inoculation with a dilution of 1:125,000 (experiment 5; also chart 2).

In an experiment done 3 weeks later, the virus had undergone a lessening of virulence so that only 55 percent of 20 control animals died following inoculation with 1:100,000 dilution. Among a similar group treated with Prontosil the mortality was reduced to 5 percent (experiment 6).

DISCUSSION

The results of these experiments are of interest in that they represent, as far as we are aware, the first instance of chemotherapeutic activity of a drug against a virus disease.

Differences in chemotherapeutic behavior of sulphonamide compounds have previously been shown in that certain of them possess selective activity against specific types of bacterial infections. These differences are further illustrated in the action upon the choriomeningitis virus. While Prontosil is inferior to sulphanilamide or some other derivatives against streptococci, meningococci, and pneumococci, against the virus Prontosil is active and these derivatives are inactive. It is hoped that this specialized activity may be of value in the chemical approach to the chemotherapy of virus infections, and work is in progress to obtain more active compounds for this purpose.

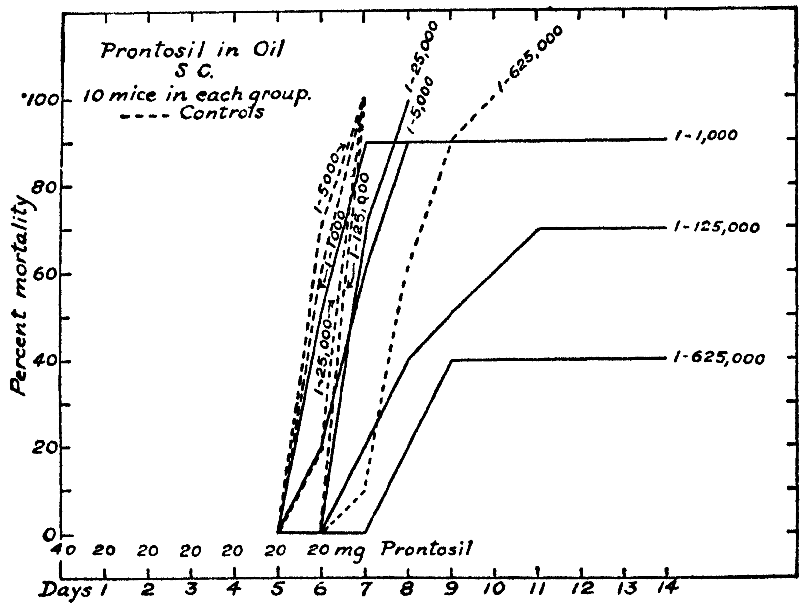


CHART 2.—The curative action of Prontosil on choriomeningitis virus is manifest only when 1 to 5 fatal doses of the virus are employed. (For details of therapy see experiment 5, table 1.)

While the activity of Prontosil has been demonstrated only on choriomeningitis virus, it is possible that related compounds will be effective against other virus diseases.

SUMMARY

Prontosil (4-sulphonamide-2-4′-diamino-azobenzene) has been shown to possess protective action in mice against infection with the virus of lymphocytic choriomeningitis. A high percentage of survivals occurred only when therapy was begun shortly after infection, employing large doses of the drug and small infective doses of the virus.

Prontosil Soluble as well as some related sulphonamide compounds not containing an azo linkage, which are more active than Prontosil against bacterial infections, were found to be inactive against this virus infection.

No therapeutic activity was obtained against the influenza virus or the encephalitis virus (St. Louis type) with Prontosil or the related compounds studied.

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TOXICOLOGY OF SELENIUM

IV. EFFECTS OF EXPOSURE TO HYDROGEN SELENIDE[1]

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Selenium as a possible industrial hazard has so far received but little attention. Quite likely this has been due to its minor industrial application until recent years. As early as 1925, Hamilton (*3*, *4*) reported cases of selenium poisoning in a copper refinery. While such evidence is not conclusive of toxicity (since other factors may be involved), it is indicative. That absorption of selenium does occur in workers employed in the extraction and purification of the element has recently been shown by Dudley (*1*).

The recent investigations on the toxic effects of the ingestion of small quantities of selenium compounds and selenium-bearing vegetation have been summarized by Byers (*2*). The results emphasize the importance of selenium. If ingestion produces such marked effects, it is quite possible that the inhalation of small quantities of selenium compounds would be attended with even more significant results.

The increasing industrial applications of selenium and the fact that workers may be exposed to hydrogen selenide have led the authors to make a further study of the toxicity of this substance. The purpose of this investigation was to determine the toxic limits of hydrogen selenide, H_2Se, in terms of both length of exposure and concentration of the gas. The immediate purpose of this part of the investigation is (*a*) to determine the toxic limits of hydrogen selenide with single expo-

[1] From the Division of Industrial Hygiene, National Institute of Health, Washington, D. C. Manuscript completed Mar. 8, 1937.

sures of 10, 30, and 60 minutes for guinea pigs and (*b*) to determine the effects of such exposures. The results of pathological examinations of the animals are given in order better to fulfill the second of these objectives.

I. TECHNIQUE, APPARATUS, AND METHODS

The apparatus for exposing the animals to a continuous flow of an air-gas mixture of constant composition is shown in figures 1 and 2. The purpose of this type of exposure set-up was two-fold: (1) to secure a continuous flow of an air-gas mixture of constant composition, sufficiently flexible to allow the formation of various concentrations of hydrogen selenide, and (2) to provide an apparatus such that animals might be exposed to a definite concentration for a definite period of time.

A constant flow of the air-gas mixture was desirable in order more nearly to simulate actual conditions and likewise to prevent the increase of carbon dioxide and water vapor in the chamber atmosphere during animal exposure tests.

The apparatus described herein is similar in principle to that described by Fries and West (*5*) (p. 354).

The air stream was drawn through the chamber by means of a pump attached to the outlet. Since the chamber was sealed at all points, the air entering passed through the mixing bulb at the intake port. This intake port was located at the front, upper right-hand side of the chamber, while the exhaust port, connected to the flow meter and pump (see fig. 1), was located at the rear, lower left-hand side of the chamber.

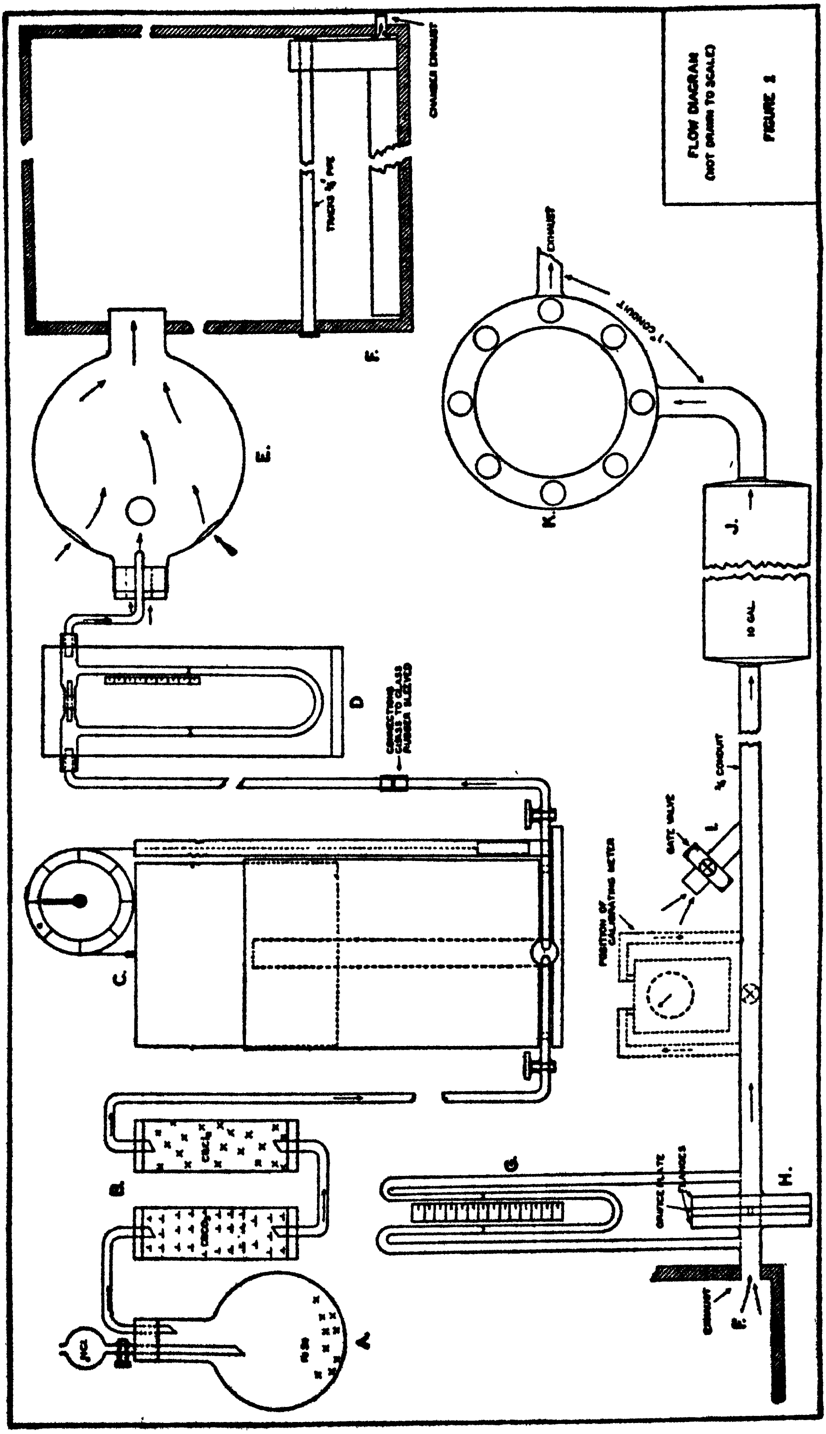
The sliding cage carrier (see fig. 2) was designed to facilitate the exposure of the animals to an air-hydrogen selenide mixture of definite concentration. By this means the animals were introduced into the chamber with a minimum of dilution of the chamber atmosphere. The disadvantages of exposing the animals by placing in a chamber and building up the concentration to the required value are eliminated. By such arrangement as herein described, the dilution is estimated to be less than 5 percent for the first minute and to reach the original concentration in less than 3 minutes.

A. DETAILS OF APPARATUS

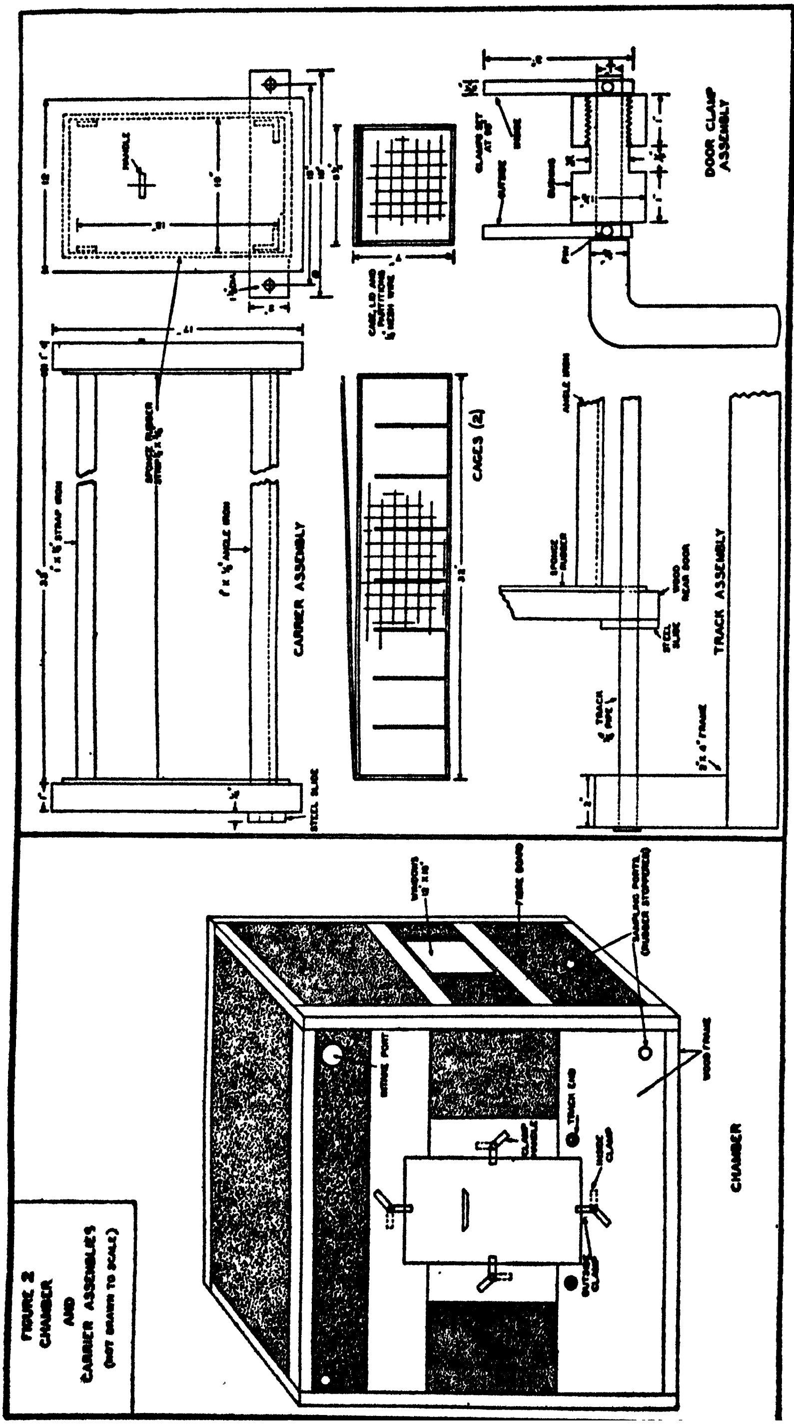
Letters following the names of parts of apparatus refer to those shown in figure 1.

Gas generator and dryer (A, B).—Hydrogen selenide was generated by the action of hydrochloric acid (15 percent by weight HCl) on granular ferrous selenide.

$$2\ HCl + FeSe \longrightarrow H_2Se + FeCl_2$$



Sketch of apparatus used to furnish a continuous flow of air-gas mixture of definite concentration.



Details of chamber and sliding carrier.

On gently heating the mixture there is a moderate evolution of H_2Se. The H_2Se was passed first over calcium carbonate and then over calcium chloride, in large capacity drying tubes. These reagents remove all the moisture and acid vapors which are driven over by heating of acid mixture.

Gasometer (C).—The gasometer used was a standard Sanborn vital capacity spirometer, 6 liters, calibrated in one-tenth liter. U. S. P. liquid petrolatum was used in place of the usual water seal. The H_2Se was led into the spirometer until six liters were present. The generator was then allowed to cool and the generating and drying system closed from the spirometer. By timing the outflow of the H_2Se through the flow meter and reading the volume from the indicator dial, the theoretical concentration was calculated as shown below. An increase in pressure in the spirometer was secured by placing weights on top the float. Such a method of securing a greater flow of H_2Se was easily controlled.

H_2Se flow meter (D).—By varying the weights placed on the spirometer float and likewise varying the size of the capillary orifice, the concentration of H_2Se in the air stream was easily controlled. Liquid petrolatum was used in the manometer as a means of measuring the differential pressures on the orifice.

Mixing bulb (E).—The mixing bulb was constructed from a 3-liter, round-bottom, short-neck, Pyrex flask. A 2-inch glass tube was sealed to the bottom, opposite the neck and parallel with it. Three ¾-inch holes were blown in the flask wall, spaced 2 inches from and equidistant around the neck. As the 200-liter per minute flow of air passed through the bulb, the H_2Se was fed into the neck from a small nozzle. The nozzle was connected directly to the H_2Se flow meter. The swirling motion caused by the three incoming currents of air thoroughly mixed the H_2Se with the air stream before it entered the chamber.

Exposure chamber (F).—Inside dimensions, 1 meter, cube. Capacity, 1,000 liters (less volume of apparatus and animals contained). Constructed of ¼-inch waterproofed Masonite fiberboard; wood frame; glass windows, 12 by 18 inches, 3 sides; coated inside and seams sealed with cellulose acetate (in C. P. acetone). An 8-inch non-oscillating electric fan was used in order to give complete mixing throughout the whole of the interior.

Chamber flow meter (G).—A carefully machined orifice of ½-inch diameter in ⅛-inch stainless steel plate was mounted between ¾-inch pipe flanges, ground so as to give gastight joints. A manometer containing liquid petrolatum was mounted to show the differential pressures caused by this orifice. By means of a gate valve (I) at a Y in the suction line back of the orifice, the amount of air flowing past the orifice could be controlled. The flow meter was calibrated under

actual operating conditions, using a standardized American Meter Co. bellows dry-flow meter. This flow meter was connected in the line between the orifice and the Y connection when the chamber flow was calibrated. For results see table 2.

Equalizing chamber (J).—In order to secure a more even flow of air a 10-gallon galvanized expansion tank was placed in the suction line.

Air pump (K).—Leiman, rotary type C, without equalizer on outlet, motor driven. Motor: ½-H. P., 200 V., A. C., 1,750 r. p. m. Pump: 400 r. p. m.; total capacity, 18½ cubic feet per minute. Three-fourths inch conduit from chamber to equalizer tank; 1-inch pipe to pump; 1-inch conduit exhaust to stack.

B. METHODS OF SAMPLING AND ANALYSIS

1. *Analytical concentrations.*—The analytical method used to obtain the concentrations of hydrogen selenide has been fully described in a previous paper for air-diethyl selenide mixtures (*1*). Air samples were drawn from the chamber through two bubblers containing 40 percent HBr with free bromine (10 percent by weight), by means of an aspirating bottle. The selenium was precipitated from the acid solution with sulphur dioxide, and hydroxylamine hydrochloride, filtered, washed, redissolved with brominated HBr, precipitated as before, filtered on weighed Gooch crucibles, dried at 105° C., and weighed as Se.

The total H_2Se in the air sample was calculated by means of the factor 1.03:

$$\frac{\text{Wt. of Se (mg)} \times 1.03}{\text{Vol. of sample (liters)}} = \text{Conc. in chamber (mg of } H_2Se/l).$$

2. *Theoretical or calculated concentrations.*—The theoretical concentrations were calculated in order to check the analytical figures and to determine the relative accuracy of the two methods of evaluating gas-air concentrations.

The gas contained in the spirometer was drawn into two gas-sampling bottles of known volume. These gas samples were analyzed for total selenium by absorbing the gas in 45 percent hydrobromic acid with 10 percent free bromine, and the selenium determined as previously indicated. On converting the Se found to mg H_2Se and substituting the values in the following formula, the chamber concentration can be found with fair accuracy:

$$\frac{\text{Total vol. of gas from spirometer (cc)} \times \text{av. mg } H_2Se/\text{cc in sample}}{\text{Rate of flow through chamber} \times \text{length of run (min.)}} = \text{Conc. (mg } H_2Se/l)$$

(For results see test runs E, F, and G, table 1.)

The theoretical concentrations were determined in order to check the relative accuracy of the two methods. In all animal exposure tests, the concentrations reported were obtained by the analytical procedure outlined above. The concentrations reported for animal

exposure tests are the results of analysis of air samples taken during the time of exposure.

The relation between analytical and theoretical concentrations is shown in table 1. The constant positive error of the theoretical concentrations is explained by reason of decomposition and absorption of hydrogen selenide in the spirometer. Minor leaks may also contribute to this error, since the diminution of volume in the spirometer is calculated as the total H_2Se entering the chamber. A sample calculation is given below, based on the above formula and data from test run E:

Analytical concentration 0.40 mg H_2Se/l.
Theoretical concentration:
  Rate of chamber flow=200 l/min.
  Length of run=38 min.
  Total gas from spirometer=3,000 cc.
  Spirometer gas=32.94% H_2Se.
  Spirometer gas=1.093 mg H_2Se/cc.
  Concentration (calculated)=0.43 mg H_2Se/l.
  Error=+6.9%.

TABLE 1.—*Comparison of analytical and calculated concentrations*

Run no.	Analytical concentrations mg H_2Se/l	Calculated concentrations mg H_2Se/l
E	0 40	0.43
F	0 55	0.59
G	0 23	0.28

C. CALIBRATION OF APPARATUS

As the purpose of the chamber set-up previously described was to furnish a constant stream of air-gas mixture of constant composition, certain determinations were necessary in order to check the efficiency of the apparatus.

The results of calibration of the chamber flow are shown in table 2. A standard flow meter was coupled in the line (see fig. 1), and the flow was determined at various manometer settings.

TABLE 2.—*Calibration of chamber flow*

Run	Time of flow		Total flow	Manometer difference	Average flow, liters/minutes
	Minutes	*Seconds*	*Cubic feet*	*mm*	
1	5	4	45	66	251.4
2	8	1	71	60	250 7
3	5	6	26	20	144.3
4	5	6	26	20	144.3
5	10	9	52	20	145.0
6	6	6	44	42	204.5
7	7	5	51	42	203.7
8	4	4	29	40	201 8
9	7	3	50	40	200.7
10	8	1	56	36	197.7
11	10	4	70	36	196.8
12	13	5	93	38	201.2
13	14	3	100	38	201.4
14	60	7	426	38	201.5

A constant flow of 200 liters per minute was desired. Runs 12, 13, and 14 indicate that this flow may be maintained with an error of less than 1.0 percent.

The results of test runs B and C shown in table 3 indicate that concentrations may be held constant for a period of 2 hours at relatively high concentrations of H_2Se. The low value of the 10- to 15-minute sampling period of run B is explained by the fact that the concentration was not built up to constant value before this time. In all exposure runs, at least 20 minutes were allowed for the concentration to reach a constant value before introducing animals into the chamber.

All air samples of runs B and C were drawn from the center of chamber.

TABLE 3.—*Variation of composition of chamber atmosphere with time*

Test run	Sample [1]	Sampling time	Volume of sample	Weight of Se	Analytical concentration mg H_2Se/l
		Minutes	*Liters*	*Milligrams*	
B	1	10–15	10	5.1	0.53
	2	15–20	10	6.2	.64
	3	20–25	10	5.8	.60
	4	25–30	10	5.8	.60
	5	35–40	10	5.5	.57
	6	45–50	10	5.9	.61
	7	50–55	10	5.7	.59
C	1	10–20	13½	2.8	0.21
	2	30–40	14	2.9	.21
	3	60–70	14	3.0	.22
	4	90–100	14	2.7	.20
	5	120–130	14	2.8	.21

[1] All samples taken from center of chamber.

In order to show that distribution of the H_2Se throughout the chamber was equal, samples were drawn from eight different positions in the chamber. These results (test run D) are given in table 4. Sampling tubes were located at seven corners of the chamber, none being taken at the corner where the air stream enters the chamber. Position 5 was at the center of the chamber where previous samples had been taken.

TABLE 4.—*Distribution of H_2Se in chamber*

Test run	Sample	Sampling time	Volume of sample	Position sampled [1]	Weight of Se	Analytical concentration, mg H_2Se/l
		Minutes	*Liters*		*Milligrams*	
D	1	10– 20	14	2	3.0	0.22
	2	25– 35	14	1	3.2	.24
	3	40– 50	14	5 (c)	3.0	.22
	4	50– 60	14	3	2.9	.21
	5	70– 80	14	4	3.0	.22
	6	80– 90	14	6	2.9	.21
	7	90–100	14½	8	3.1	.22
	8	100–110	14	7	3.1	.23
	9	110–115	14	5 (c)	2.9	.21

[1] Position 5 at center of chamber, remainder at corners.

For animal exposures samples were drawn from the chamber at a level with the animals and within three inches of the cages.

II. RESULTS OF EXPOSURE

A. SYMPTOMS

The immediate effects of hydrogen selenide when guinea pigs are exposed to the higher concentrations is to produce acute eye and nasal irritation as evidenced by pawing of the nose and eyes immediately on being placed in the chamber. At the higher concentrations, as in the 10-minute exposure runs, a copious flow of mucus came from the nasal passages. In the longer exposure tests, at the lower concentrations, the discharge from the nose was much less marked; however, the pawing of the nose and eyes was still evidenced, though less spasmodically. In the 30- and 60-minute exposures, after 15 minutes in the chamber the activity of the animals was reduced to practically nil, although slight pawing of the nose was still evidenced.

Immediately after test, the animals showed a deposit of red, amorphous selenium on the nose and head. The higher concentrations resulted in a greater deposit of selenium because of the spreading of the nasal exudate as the animals pawed the nose and eyes. In large part the selenium deposit was due to the decomposition of hydrogen selenide by the mucus of the nasal passages. No deaths occurred during the exposure period.

Marked gasping for breath, coughing, and choking of the animals persisted for 12 to 24 hours. Gasping was noted in all animals exposed to the lethal concentrations, which persisted for several days after exposure. The animals which survived the initial effects of the exposures showed decreased activity, marked difficulty in breathing, and slight food intake. The animals dying from the delayed effects of the H_2Se exposure showed tetanic convulsions often lasting 8 hours before death ensued.

When men were accidentally exposed to hydrogen selenide, the effects were immediate and drastic. The odor of the gas is similar to that of hydrogen sulphide but causes olfactory fatigue quickly so that toxic concentrations may not be detected after exposure for several minutes to low concentrations of the gas. The effect on the nose and eyes is an acute, burning sensation which persists for as much as an hour after exposure. A copious flow of tears and nasal mucus is induced which partially alleviates the burning sensation. Exposure of man produced no noticeable after-effects, except a metallic taste which persisted for several days. One subject excreted 2.5 parts of selenium per 100 million in his urine 7 days after exposure.

The animals which survived the 30-day observation period following exposure showed increased activity, greater food intake and were apparently in good health, their weight increasing markedly. When

possible, animals were sacrificed at the end of the 30-day period, likewise at 60 days after exposure, in order to determine the course of the resulting pathological changes.

B. MORTALITY DATA

In order to determine the concentrations which prove fatal as a result of 10-minute, 30-minute, and 60-minute exposures, 16 guinea pigs per run were exposed to a graded series of concentrations. The animals were then placed in cages and observations were made on their general condition and on food intake for a 30-day period. Deaths were recorded daily. Tables 5, 6, and 7 show the number of deaths by 5-day periods, for the 10-minute, 30-minute, and 60-minute exposure tests. Control animals were kept in identical cages, in the same location, and on the same diet as the exposed animals. Deaths of control animals are presented to assist in evaluating the relative toxicity of the various exposures to hydrogen selenide.

TABLE 5.—*Mortality of guinea pigs exposed for 10 minutes to H_2Se*

Concentration, mg H_2Se/l	Animals tested	Deaths, in days						Percent dead after 30 days
		1-5	6-10	11-15	16-20	21-25	26-30	
Controls	16	0	0	0	0	1	0	6.3
0.28	16	1	3	0	1	0	0	31.2
0.35	16	7	1	1	0	0	0	56.2
0.55	16	15	0	0	0	0	0	93.7
0.57	16	16	------	------	------	------	------	100

NOTE.—An exposure run was made using 16 guinea pigs, concentration 0.30 mg H_2Se/l, 10-minute exposure. Only 2 of these animals (12.5 percent) died within 30 days. As this was contrary to what might be expected from results of other runs, this exposure was duplicated. This concentration was found to be 0.35 mg H_2Se/l. Nine of the 16 animals exposed (56.2 percent) died within 30 days. See results in above table. No explanation for this discrepancy can be given. See discussion in text.

TABLE 6.—*Mortality of guinea pigs exposed for 30 minutes to H_2Se*

Concentration, mg H_2Se/l	Animals tested	Deaths, in days						Percent dead after 30 days
		1-5	6-10	11-15	16-20	21-25	26-30	
Control	32	3	0	0	0	0	0	9.4
0.002	16	0	1	0	0	0	1	12.5
0.004	16	1	3	0	0	0	0	25.0
0.012	16	4	2	0	0	0	0	37.5
0.020	16	0	0	0	1	5	1	42.7
0.036	16	2	1	2	3	3	0	68.8
0.043	16	4	5	3	3	0	0	93.7
0.24	16	16	------	------	------	------	------	100.0
0.54	16	16	------	------	------	------	------	100.0

TABLE 7.—*Mortality of guinea pigs exposed for 60 minutes to H_2Se*

Concentration, mg H_2Se/l	Animals tested	Deaths, in days						Percent dead after 30 days
		1–5	6–10	11–15	16–20	21–25	26–30	
Controls	32	3	0	0	0	0	0	9.4
0.003	16	0	1	0	0	0	0	6.3
0 004	16	1	0	0	0	0	0	6.3
0 007	16	1	0	1	0	0	0	12.5
0.011	16	2	4	0	0	0	0	37.5
0 014	16	3	2	8	1	0	0	87.5
0.020	16	2	6	6	1	1	--------	100.0
0.022	16	7	5	2	1	0	0	93.7
0.19	16	16	--------	--------	--------	--------	--------	100.0

The guinea pigs used in these tests were normal animals, weighing between 180–265 grams, with the average weight of 248 grams.

In order to clarify certain pathological changes resulting from the hydrogen selenide exposures, 80 normal guinea pigs were exposed 30 minutes to a concentration of *0.022* mg H_2Se/l of air. Animals were killed at suitable intervals and tissues were removed for examinations.

There are certain discrepancies in the results which are evident on examination of the mortality tables. There is no known satisfactory explanation for these differences, since the conditions of the experiments were held constant throughout the whole series of observations.

III. PATHOLOGY

A. ANIMALS KILLED FOR PATHOLOGICAL STUDY

Eighty guinea pigs were exposed to 0.022 mg of hydrogen selenide per liter for a single period of 30 minutes. Forty-seven died as a result of the exposure, and 33 were killed for pathological examination. One hour after exposure, two animals were killed and examined; two were killed every day for 7 days, and at intervals of 2 to 4 days until the twenty-third day after exposure; the remaining four animals were killed and examined on the thirty-eighth and fortieth days. At each autopsy the liver and spleen were weighed, because preliminary observations indicated that these organs showed the greatest change as a result of hydrogen selenide exposure.

Liver.—The most important change noted in the liver was fatty metamorphosis. This occurred in moderate degree in one of the animals killed 1 hour after exposure. In the first 2-day interval, 3 of the 6 animals examined showed moderate fatty changes; in the 3- to 7-day interval, 9 of 11 animals showed moderate to severe fatty changes; and 11 to 17 days after exposure, only a moderate amount of fat was noted in 5 of 8 guinea pigs. After 17 days only one of eight animals showed fatty metamorphosis of any appreciable grade. The fat was of the fine droplet variety, with several droplets generally

occurring in the same cell. They occurred throughout the lobule, but were often most abundant about the portal canals or at the periphery. Congestion of the sinusoids was rarely noted. In a few of the animals examined 7 days after exposure, a slight atrophy of the liver cells about the central vein in a few lobules was present. In 18 animals showing a significant degree of fatty metamorphosis of the liver, the average weight of the liver was 57.8 mg per gram of body weight, whereas in 15 animals with no hepatic fatty metamorphosis the weight was only 48. 1 mg per gram of body weight.

The average weights of the livers showed a fair correlation with the approximate degree of fatty metamorphosis. In the first 2 days, the weight of the liver tissue was 52.2 mg per gram of body weight at a time when only a moderate amount of fat was present. In the 3- to 7-day interval when the most severe fatty metamorphosis occurred, the weight rose to 58.3 mg. In the 11- to 17-day interval, when only a moderate fatty change was noted, the weight was 57.2 mg, and in the 19- to 23-day interval, when hepatic fat was found in one of the two animals, the weight was 52.1 mg per gram of body weight, while in the 38- to 40-day interval, the weight fell to 43.5 mg per gram of body weight.

Spleen.—As the interval between exposure and death increased, an appreciable enlargement of the spleen was noted. This gross hypertrophy became most marked about 11 days after exposure. The splenic weights (mg per gram of body tissue) for animals killed after different intervals were as follows: up to 2 days, 2.4 mg; 3 to 7 days, 2.6 mg; 11 to 17 days, 3.4 mg; 19 to 23 days, 3.5 mg; and 38 to 40 days, 2.1 mg. Histopathologically, an increase in the reticulo-endothelial tissue of the splenic pulp was the most prominent feature. There was an apparent increase in the size of the cells rather than an increase in the number of cells. This was evident to a slight degree the third day after exposure and became moderate to marked from the fifth through the twenty-third day. Hyperplasia of the lymphoid tissue was variable, never more than moderate in degree, occasionally slight, and often absent. Congestion of the cavernous veins occurred in only a few animals and was apparently of no significance.

Kidneys.—Fat droplets in sufficient number to indicate an appreciable degree of fatty metamorphosis were noted in 6 of 11 animals examined 3 to 7 days after exposure. In the 11- to 17-day interval, fat was present in four of eight guinea pigs, and in the 19- to 23-day period fat droplets occurred in only one of four animals; none was noted in the 38- to 40-day interval. These fatty changes in the kidney, while making their appearance later, paralleled those found in the liver. Fat droplets in appreciable number occurred in both the liver and kidney in 6 of 11 animals in the 3- to 7-day period and in 5 of 8 animals in the 11- to 17-day period. Fat was noted in both liver and

kidney in one of four animals in the 19- to 23-day period and in none in the 38- to 40-day intervals. Four days after exposure a very slight to moderate congestion of the capillaries of the cortex and occasionally of the medulla was present. No other changes in the renal tissue were noted.

Adrenals.—An irregular variation in the number of fat droplets in the cortex was present throughout the series. In an occasional animal a slight to moderate congestion of the cortex and medulla was noted.

Lungs.—A slight to moderate thickening of the alveolar wall was present in almost all of the animals examined. Slight to moderate congestion of the alveolar capillaries with extravasation of red blood cells and sometimes serum into the alveoli occurred in a number of the animals without particular reference to the time interval after exposure.

Heart.—No abnormal changes were observed.

B. PATHOLOGIC FINDINGS IN ANIMALS EXPOSED TO VARIOUS CONCENTRATIONS

An examination was made of each animal that died during the course of the experiments designed to determine the minimal lethal concentration. The animals that died as a result of hydrogen selenide exposure exhibited essentially the same pathological changes that have just been described. The amount of pathological involvement was more closely related to the time that elapsed between exposure and death than to the concentration of hydrogen selenide to which the animals were subjected or to the length of exposure.

Liver.—Fatty metamorphosis of an appreciable grade occurred in 22 of 28 animals dying within 2 days, in 6 of 10 animals dying in 3 to 7 days, and in 5 of 7 animals dying 8 to 17 days after exposure. No fatty changes were noted in animals dying later than 17 days after exposure. Of 74 surviving animals which were killed at intervals of 30 and 60 days after test, only 2 showed appreciable fatty metamorphosis; one was killed 30 days and the other 60 days after exposure. Concentrations as low as 0.004 mg per liter produced liver damage of this type. Congestion of the sinusoids was occasionally seen in some of the animals dying early in the tests. Slight atrophy of the central liver cells was only rarely noted. No evident fibrosis or necrosis was seen at any time.

Spleen.—In the animals dying in the first 5 days after exposure the spleens were generally small. After the sixth day they progressively increased in size. This hypertrophy was most marked in the animals killed at the end of 30 days. It was present in only two of seven animals killed and examined 60 days after exposure. The most prominent histopathological change was an increase in the reticulo-endothelial tissue of the splenic pulp. Lymphocytic hyperplasia was absent or slight in the animals dying in the first 5 days, but it was

moderate or marked in those killed at 30 days. Congestion of the cavernous veins was infrequently noted. In a number of the animals small hemorrhagic areas were noted in the splenic pulp, but this showed no relation to any particular exposure, concentration, or duration of life.

Kidneys.—Fine fat droplets in varying numbers were noted in the cells of the convoluted tubules and in some cases in the cells of almost all of the tubules. The fatty changes were most marked in the animals which died after exposure. Fat was infrequently noted in the sacrificed animals and then not in significant quantities. Fatty metamorphosis in the kidney and in the liver seems to be associated to a certain extent.

Lungs.—The changes in the lungs varied little in any of the animals, whether dying from the exposure or killed after 30 or 60 days. The alveolar walls showed slight thickening, and congestion of the alveolar capillaries was frequently noted. In the animals dying soon after exposure, alveoli filled with serum and red blood cells were often found; hemorrhagic areas were also present in animals which were sacrificed. Small, scattered areas of atelectasis were present in almost all of the animals examined.

Adrenals.—No particular changes were noted other than a very occasional congestion of the capillaries of the cortex.

Heart.—No changes noted.

Pancreas.—No changes noted.

The pathology produced by single exposures to relatively high concentrations of hydrogen selenide appears to be (1) an early fatty metamorphosis of the liver which seems to disappear by the twentieth day; and (2) hypertrophy of the spleen, primarily reticulo-endothelial in nature, which becomes most marked about the tenth day and progresses through the twenty-third day. Examination 40 days after exposure shows the spleen to be of normal size. The fatty changes in the kidney parallel those in the liver but are not as marked or as constant. The severity of liver, spleen, and kidney pathology seems to depend more on the length of time that intervenes between exposure and death than it does on the concentration of hydrogen selenide or the duration of exposure.

SUMMARY

Guinea pigs were exposed to hydrogen selenide in accurately controlled concentrations ranging from 0.57 to 0.002 mg per liter for single exposures of 10, 30, and 60 minutes. The apparatus is described in detail. All animals exposed to 0.57 mg per liter for 10 minutes died within 5 days; 93 percent of the animals exposed to 0.043 mg per liter for 30 minutes died within 30 days; and all animals exposed to 0.02 mg per liter for 60 minutes died within 25 days. The patho-

logical changes resulting from the exposures were, primarily, an early fatty metamorphosis of the liver and a hypertrophy of the spleen which developed later.

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BIOLOGICAL PRODUCTS

Establishments Licensed for the Propagation and Sale of Viruses, Serums, Toxins, and Analogous Products

There is presented herewith a list of the establishments holding licenses issued by the Treasury Department in accordance with the act of Congress approved July 1, 1902, entitled "An act to regulate the sale of viruses, serums, toxins, and analogous products in the District of Columbia, to regulate interstate traffic in said articles, and for other purposes."

The licenses granted to these establishments for the products mentioned do not imply an endorsement of the claims made by the manufacturers for their respective preparations. The granting of a license means that inspection of the establishment concerned and laboratory examinations of samples of its products are made regularly to insure the observance of safe methods of manufacture, to ascertain freedom from contamination, and to determine the potency or safety, or both, of botulinus antitoxin, diphtheria antitoxin, histolyticus antitoxin, odematiens antitoxin, perfringens antitoxin, scarlet fever streptococcus antitoxin, staphylococcus antitoxin,

tetanus antitoxin, vibrion septique antitoxin, antidysenteric serum, antimeningococcic serum, antipneumococcic serum, bacterial vaccines made from typhoid bacillus, paratyphoid bacillus A, and paratyphoid bacillus B, diphtheria toxin-antitoxin mixture, diphtheria toxoid, diphtheria toxin for Schick test, scarlet fever streptococcus toxin for Dick test, scarlet fever streptococcus toxin for immunization, and the arsphenamines, the only products for which potency standards or tests have been established.

The enumeration of the products is as follows: Serums are placed first, the antitoxins, being more important, heading the list. The other products are arranged generally in the order of their origin. The items in each class are arranged alphabetically.

Establishments Licensed and Products for Which Licenses Have Been Issued

AMERICAN ESTABLISHMENTS

Parke, Davis & Co., Detroit, Mich.—License no. 1:

Diphtheria antitoxin; gonococcus antitoxin; meningococcus antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin; vibrion septique antitoxin; antianthrax serum; antidysenteric serum; antigonococcic serum; anti-influenza bacillus serum; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; hemostatic serum (Lapenta); normal horse serum; thyroidectomized horse serum; smallpox vaccine; rabies vaccine (Cumming); tuberculin old; tuberculin T. R.; tuberculin B E ; tuberculin B. F.; bacterial vaccines made from acne bacillus, acne diplococcus, Brucella melitensis, colon bacillus, dysentery bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, prodigiosus bacillus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus and typhoid bacillus, diphtheria toxin-antitoxin mixture; diphtheria toxoid-antitoxin mixture; diphtheria toxoid, staphylococcus toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; animal epidermal extracts; animal food extracts; vegetable food extracts; poison ivy extract; pollen extracts; modified bacterial derivatives made from colon bacillus, gonococcus, paratyphoid bacillus A, paratyphoid bacillus B, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigens made from colon bacillus, gonococcus, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, and streptococcus.

Mulford Biological Laboratories, Sharp & Dohme, Broad and Wallace Streets, Philadelphia, Pa.—License no. 2:

Botulinus antitoxin; diphtheria antitoxin; erysipelas streptococcus antitoxin; B. histolyticus antitoxin; B. odematiens antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; B. sordelli antitoxin; staphylococcus antitoxin; tetanus antitoxin; vibrion septique antitoxin; antianthrax serum; antidysenteric serum; antierysipeloid serum; antigonococcic serum; anti-influenza bacillus serum; antimelitensis serum; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum, antitularemic serum, antivenin (Nearctic crotalidae); antivenin Bothropic; antivenin (crotalus terrificus); antivenin (Latrodectus mactans); acute anterior poliomyelitis immune serum (human); measles immune serum (human); scarlet fever immune serum (human); normal human serum; immune globulin (human); normal horse serum; smallpox vaccine; rabies vaccine (Pasteur); rabies vaccine (killed virus); tuberculin old; tuberculin T. R ; tuberculin B. E.; tuberculin B. F.; bacterial vaccines made from acne bacillus, cholera vibrio, colon bacillus, dysentery bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, Brucella melitensis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, plague bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, bacterium tularense, and typhoid bacillus; sensitized bacterial vaccines made from acne bacillus, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; staphylococcus toxoid; tetanus toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extracts; animal epidermal extracts; animal food extracts; vegetable food extracts; poison ivy extract; poison oak extract; pneumococcus antibody solution; bacterial antigens made from acne bacillus, colon bacillus, dysentery bacillus, Friedländer bacillus, gonococcus, influ-

enza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, proteus bacillus, pyocyaneus bacillus, staphylococcus aureus, streptococcus, typhoid bacillus; bee venom; snake venom solution.

The Cutter Laboratory, Berkeley, Calif.—License no. 8:

Diphtheria antitoxin; B. odematiens antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; B. sordelli antitoxin; tetanus antitoxin; vibrion septique antitoxin; antianthrax serum; antimeningococcic serum; antistreptococcic serum; normal horse serum; smallpox vaccine; rabies vaccine (killed virus); tuberculin old; tuberculin B. F.; bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigens made from colon bacillus, staphylococcus aureus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; pollen extracts; poison ivy extract; poison oak extract.

Bureau of Laboratories, Department of Health, Foot East Sixteenth Street, New York City.—License no. 14:

Smallpox vaccine.

Lederle Laboratories, Inc., Pearl River, N. Y.—License no. 17:

Diphtheria antitoxin; erysipelas streptococcus antitoxin; B. histolyticus antitoxin; B. odematiens antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; staphylococcus antitoxin; B. sordelli antitoxin; tetanus antitoxin; vibrion septique antitoxin; antianthrax serum; antidysenteric serum; antigonococcic serum; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; measles immune serum; immune globulin (human); normal horse serum; smallpox vaccine; rabies vaccine (killed virus); tuberculin old; tuberculin B. E ; tuberculin B. F.; bacterial vaccines made from acne bacillus, Brucella melitensis, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, plague bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; tetanus toxoid; staphylococcus toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extracts; poison ivy extract; poison oak extract; animal epidermal extracts; animal food extracts; vegetable food extracts; animal oil extracts; vegetable oil extracts; fungus extracts; snake venom solution.

G. H. Sherman, M. D., Inc., 14600 East Jefferson Avenue, Detroit, Mich.—License no 30:

Bacterial vaccines made from acne bacillus, Brucella melitensis, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; pollen extracts; bacterial antigens made from colon bacillus, gonococcus, micrococcus catarrhalis, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, and streptococcus.

The Abbott Laboratories, Fourteenth Street and C.-W. Interurban Railroad Tracks, North Chicago, Ill.—License no. 43:

Bacterial vaccines made from acne bacillus, Brucella melitensis, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, micrococcus tetragenus, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigens made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, micrococcus catarrhalis, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus; pollen extracts; animal epidermal extracts; animal food extracts; vegetable food extracts; fungus extracts.

The Upjohn Co., Kalamazoo, Mich.—License no. 51:

Bacterial vaccines made from colon bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigens made from colon bacillus, staphylococcus aureus, streptococcus.

E. R. Squibb & Sons' Research and Biological Laboratories, New Brunswick, N. J.—License no. 52:

Diphtheria antitoxin, erysipelas streptococcus antitoxin, perfringens antitoxin, scarlet fever streptococcus antitoxin, staphylococcus antitoxin; tetanus antitoxin; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; immune globulin (human); normal horse serum; antivenin (Latrodectus mactans); smallpox vaccine; rabies vaccine (Pasteur); rabies vaccine (killed virus); bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, streptococcus, and typhoid bacillus; bacterial antigen made from staphylococcus aureus; leucocytic extract from the horse; diphtheria toxin-antitoxin mixture; diphtheria toxoid; staphylococcus toxoid; tetanus toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extracts; poison ivy extract; poison oak extract; arsphenamine, neoarsphenamine, sulpharsphenamine.

Eli Lilly & Co., Indianapolis, Ind.—License no. 56:

Diphtheria antitoxin; erysipelas streptococcus antitoxin; perfringens antitoxin; tetanus antitoxin; vibrion septique antitoxin; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; normal horse serum; hemostatic serum (Lilly); heterophile antibody; smallpox vaccine; rabies vaccine (Harris); tuberculin old; bacterial vaccines made from acne bacillus, cholera vibrio, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, plague bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial vaccine made from partially autolized pneumococci; diphtheria toxin-antitoxin mixture; diphtheria toxoid; tetanus toxoid; diphtheria toxin for Schick test, bacterial antigens made from acne bacillus, colon bacillus, gonococcus, pneumococcus, staphylococcus albus, staphylococcus aureus, and streptococcus.

Gilliand Laboratories, Marietta, Pa.—License no. 63:

Diphtheria antitoxin; perfringens antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin; vibrion septique antitoxin; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; normal horse serum; smallpox vaccine; rabies vaccine (Pasteur); rabies vaccine (killed virus); tuberculin old; tuberculin B. E.; tuberculin, B. F.; bacterial vaccines made from acne bacillus, gonococcus, influenza bacillus, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization.

Antitoxin and Vaccine Laboratory, Department of Public Health, Commonwealth of Massachusetts, 375 South Street, Jamaica Plain, Boston 30, Mass.—License no. 64:

Diphtheria antitoxin; scarlet fever streptococcus antitoxin; antimeningococcic serum; antipneumococcic serum; smallpox vaccine; tuberculin old; bacterial vaccines made from paratyphoid bacillus A, paratyphoid bacillus B, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid, diphtheria toxin for Schick test.

United States Standard Products Co., Woodworth, Wis —License no. 65:

Diphtheria antitoxin; erysipelas streptococcus antitoxin; perfringens antitoxin; tetanus antitoxin; vibrion septique antitoxin; antimeningococcic serum; normal horse serum; smallpox vaccine; rabies vaccine (killed virus); bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigens made from staphylococcus albus, staphylococcus aureus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; tetanus toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extracts; poison ivy extract.

D. L. Harris Laboratories, Metropolitan Building, St. Louis, Mo.—License no. 66:

Rabies vaccine (Harris).

The Arlington Chemical Co., Yonkers, N. Y.—License no 67:

Bacterial vaccines made from colon bacillus, micrococcus catarrhalis, micrococcus tetragenus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, and streptococcus; fungus extracts; pollen extracts; animal epidermal extracts; animal food extracts; vegetable food extracts.

Dermatological Research Laboratories, 1720 Lombard Street, Philadelphia, Pa.—License no. 68:

Arsphenamine; silver arsphenamine; neoarsphenamine; sulpharsphenamine; bismuth arsphenamine sulphonate; neosilver arsphenamine.

The Winthrop Chemical Co., Inc., 33 Riverside Avenue, Rensselaer, N. Y.—License no. 69:

Arsphenamine; arsphenamine diglucoside; neoarsphenamine; sodium arsphenamine; silver arsphenamine; neosilver arsphenamine; sulpharsphenamine.

Diarsenol Co., Inc., 72 Kingsley Street, Buffalo, N. Y.—License no. 70:

Arsphenamine; neoarsphenamine; sodium arsphenamine; sulpharsphenamine.

Mallinckrodt Chemical Works, St. Louis, Mo.—License no. 77:

Arsphenamine; neoarsphenamine; sulpharsphenamine.

Merck & Co., Inc., Rahway, N. J.—License no. 82:

Arsphenamine; neoarsphenamine; sulpharsphenamine.

Terrell Laboratories, Texas National Bank Building, Fort Worth, Tex.—License no. 84:

Rabies vaccine (killed virus).

Jensen-Salsbery Laboratories, Twenty-first and Penn Streets, Kansas City, Mo.—License no. 85:

Botulinus antitoxin; antianthrax serum; rabies vaccine (killed virus); bacterial vaccine made from Brucella melitensis; diphtheria toxin for Schick test; diphtheria toxoid.

Hollister-Stier Laboratories, Paulson Medical and Dental Building, Spokane, Wash.—License no. 91:

Acute anterior poliomyelitis immune serum (human); bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and xerosis bacillus; pollen extracts; poison ivy extract; poison oak extract; animal epidermal extracts, vegetable food extracts.

Medical Arts Laboratory, Medical Arts Building, Oklahoma City, Okla.—License no. 98:
Rabies vaccine (killed virus).

Bureau of Laboratories, Michigan State Department of Health, Lansing, Mich.—License no. 99:
Diphtheria antitoxin; scarlet fever streptococcus antitoxin; tetanus antitoxin; antimeningococcic serum, antipneumococcic serum; smallpox vaccine; rabies vaccine (Cumming); tuberculin old; bacterial vaccines made from pertussis bacillus and typhoid bacillus; diphtheria toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization.

National Drug Co., 5109 Germantown Avenue, Philadelphia, Pa.—License no. 101:
Diphtheria antitoxin, erysipelas streptococcus antitoxin; scarlet fever streptococcus antitoxin; perfringens antitoxin; tetanus antitoxin; vibrion septique antitoxin; antimeningococcic serum; antipneumococcic serum; antistreptococcic serum; immune globulin (human); normal horse serum; tuberculin old; smallpox vaccine; rabies vaccine (killed virus), bacterial vaccines made from acne bacillus, Brucella melitensis, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, meningococcus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; staphylococcus toxoid; tetanus toxoid; diphtheria toxin for Schick test; scarlet fever streptococcus toxin for Dick test; scarlet fever streptococcus toxin for immunization; pollen extracts.

Mulford Colloid Laboratories, Thirty-eighth and Ludlow Streets, Philadelphia, Pa.—License no. 102:
Poison ivy extract; poison oak extract.

Allergy Laboratories, 1200 North Walker Street, Oklahoma City, Okla.—License no. 103:
Pollen extracts; vegetable food extracts; animal epidermal extracts

Hixson Laboratories (Inc.), Johnstown, Ohio.—License no. 104:
Diphtheria antitoxin; tetanus antitoxin; antimeningococcic serum; normal horse serum; rabies vaccine (killed virus); bacterial vaccines made from acne bacillus, colon bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, pseudodiphtheria bacillus, staphylococcus albus, staphylococcus aureus, streptococcus and typhoid bacillus; diphtheria toxin-antitoxin mixture; diphtheria toxoid; tetanus toxoid; diphtheria toxin for Schick test.

C. F. Kirk Co, Bloomfield, N. J.—License no 105:
Bacterial vaccines made from acne bacillus, colon bacillus, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus and typhoid bacillus; pollen extracts.

Knapp & Knapp, 224 North Olive Avenue, Burbank, Calif.—License no 106:
Pollen extracts.

The Porro Biological Laboratories, 718 Medical Arts Building, Tacoma, Wash —License no. 107:
Bacterial vaccines made from micrococcus catarrhalis, pneumococcus, staphylococcus aureus, and streptococcus; pollen extracts.

Central Pharmacal Co., Breslin Medical Arts Building, Louisville, Ky.—License no. 109
Bacterial antigens made from colon bacillus, Friedländer bacillus, gonococcus, micrococcus catarrhalis, pertussis bacillus, pneumococcus, pyocyaneus bacillus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus.

Pitman-Moore Co, Zionsville, Ind.—License no. 110:
Diphtheria antitoxin; tetanus antitoxin; antierysipeloid serum; immune globulin (human); rabies vaccine (killed virus); bacterial vaccines made from acne bacillus, colon bacillus, Brucella melitensis, Friedländer bacillus, gonococcus, influenza bacillus, micrococcus catarrhalis, micrococcus tetragenus, paratyphoid bacillus A, paratyphoid bacillus B, pertussis bacillus, pneumococcus, staphylococcus albus, staphylococcus aureus, streptococcus, and typhoid bacillus; bacterial antigens made from colon bacillus, gonococcus, staphylococcus albus, staphylococcus aureus, streptococcus; diphtheria toxoid; tetanus toxoid; pollen extracts.

The Wm. S. Merrell Co., Cincinnati, Ohio.—License no. 111:
Bacterial vaccines made from colon bacillus, Friedländer bacillus, influenza bacillus, micrococcus catarrhalis, paratyphoid bacillus A, paratyphoid bacillus B, pneumococcus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, streptococcus, typhoid bacillus; diphtheria toxoid, diphtheria toxin for Schick test.

John Wyeth and Brother, Inc., Biologic Division, Tucson, Ariz.—License no. 112:
Bacterial antigen made from streptococcus.

Michael Reese Hospital, Twenty-ninth Street and Ellis Avenue, Chicago, Ill.—License no. 113:
Acute anterior poliomyelitis immune serum (human); measles immune serum (human); scarlet fever immune serum (human); normal human serum.

The Milwaukee Serum Center, Columbia Hospital, Milwaukee, Wis.—License no. 117:
Acute anterior poliomyelitis immune serum (human); measles immune serum (human); scarlet fever immune serum (human); normal human serum.

Barry Allergy Laboratory, Michigan Theater Building, Detroit, Mich.—License no. 119:
Pollen extracts.

Biological Laboratory, Illinois Department of Health, Springfield, Ill.—License no. 120:

Rabies vaccine (killed virus); bacterial vaccine made from typhoid bacillus; diphtheria toxoid; diphtheria toxin for Schick test.

State Department of Health, Austin, Tex.—License no. 121:

Rabies vaccine (killed virus); bacterial vaccines made from paratyphoid bacillus A, paratyphoid bacillus B, typhoid bacillus; diphtheria toxin for Schick test; diphtheria toxoid.

Turner's Clinical and X-ray Laboratories, El Paso, Tex.—License no. 122:

Rabies vaccine (killed virus).

Manhattan Convalescent Serum Laboratory, Health Research Fund, Inc., Fifteenth Street and East River, New York, N. Y.—License no. 123:

Measles immune serum (human); scarlet fever immune serum (human); normal human serum.

Childrens' Hospital Convalescent Serum Center, Los Angeles, Calif.—License no. 124:

Measles immune serum (human); acute anterior poliomyelitis immune serum (human); scarlet fever immune serum (human); normal human serum.

Hynson, Westcott and Dunning, Baltimore, Md.—License no. 125:

Snake venom solution.

Morrison Antigen Co., Missouri Theater Building, Grand and Lucas Avenues, St. Louis, Mo.—License no. 126:

Bacterial antigens made from colon bacillus, gonococcus, influenza bacillus, pertussis bacillus, pneumococcus, staphylococcus aureus, streptococcus, typhoid bacillus.

FOREIGN ESTABLISHMENTS

Institut Pasteur de Paris, 36 rue du Dr. Roux, Paris, France.—License no. 11. Selling agents for the United States, Mr. A. Charklian, Pasteur Vaccine Laboratories of France, 516 Fifth Avenue, New York, N. Y.:

Diphtheria antitoxin; tetanus antitoxin; antianthrax serum; antidysenteric serum; antiplague serum; antistreptococci serum; bacterial vaccines made from cholera vibrio, plague bacillus, staphylococcus albus, and staphylococcus aureus.

Interessen Gesellschaft Farbenindustrie Aktiengesellschaft, Hoechst am Main, Germany.—License no. 24. Selling agents for the United States, The Winthrop Chemical Co., 170 Varick Street, New York, N. Y.:

Tuberculin old; tuberculin T. R.; tuberculin B. E.; tuberculin B. F.; bacterial vaccines made from cholera vibrio, gonococcus, staphylococcus albus, staphylococcus aureus, and staphylococcus citreus; typhoid bacillus; sensitized bacterial vaccine made from typhoid bacillus; fungus extracts; arsphenamine; neoarsphenamine; sodium arsphenamine; silver arsphenamine; neosilver arsphenamine; sulpharsphenamine; sulphoxylarsphenamine.

Connaught Antitoxin Laboratory, University of Toronto, Toronto, Canada.—License no 73.

Diphtheria antitoxin; staphylococcus antitoxin; tetanus antitoxin; diphtheria toxoid; staphylococcus toxoid.

Laboratoire de Biochimie Medicale, 19-21 rue Van-Loo, Paris, France.—License no. 83 Selling agents for the United States, Anglo-French Drug Co., 1270 Broadway, New York, N. Y., selling agents for Puerto Rico, Chas Vere, box 216, San Juan, P. R.:

Sulpharsphenamine.

Instituto Sieroterapico Milanese, Via Darwin 20, Milan, Italy.—License no. 87. Selling agents for the United States, Italian Drugs Importing Co., 225 Lafayette Street, New York, N. Y.; selling agent for Puerto Rico, Mr Braulio Caballero, San Juan, P. R.

Antianthrax serum; bacterial vaccines made from colon bacillus, gonococcus, pneumococcus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, and streptococcus; neoarsphenamine; acetyle-glycoarsphenamine.

Boots Pure Drug Co., Ltd., Nottingham, England —License no. 92. Selling agents for the United States, The United Drug Co., 43 Leon Street, Boston, Mass.:

Arsphenamine diglucoside.

Sero-Bacteriological Department, Bayer-Meister-Lucius, Behringswerke, I. G. Farbenindustrie, A. G. Section, Marburg-Lahn, Germany.—License no. 97. Selling agents for the United States, The Winthrop Chemical Co., 170 Varick Street, New York, N. Y.

Diphtheria antitoxin; tetanus antitoxin; antistreptococcic serum; normal horse serum; bacterial vaccines made from colon bacillus, gonococcus, pneumococcus, pyocyaneus bacillus, staphylococcus albus, staphylococcus aureus, and streptococcus.

Laboratoire de Bacteriophage, 75 rue Olivier de Serres, Paris, France.—License no. 108. Selling agents for the United States, Anglo-French Drug Co, 1270 Broadway, New York, N. Y.; selling agents for Puerto Rico, Mr. Joaquin Belendez, San Juan, P. R.

Bacterial antigens made from colon bacillus, dysentery bacillus, enterococcus, Friedländer bacillus, paratyphoid bacillus A, paratyphoid bacillus B, pneumococcus, proteus bacillus, pyocyaneus bacillus, staphylococcus albus, staphylococcus aureus, staphylococcus citreus, streptococcus, and typhoid bacillus.

Dr. Kade, Elisabeth Ufer 35, Berlin SO, 36, Germany.—License no. 114:

Bacterial vaccine made from colon bacillus.

La Biotherapie, 5, rue Paul-Barruel, Paris, France.—License no. 115:
Bacterial vaccines made from cholera vibrio, dysentery bacillus, paratyphoid bacillus A, paratyphoid bacillus B, and typhoid bacillus; bacterial antigens made from pneumococcus, staphylococcus albus, staphylococcus aureus, and streptococcus.

Laboratorio Brasileiro de Chimiotherapia, Rua General Roca No. 28, Rio de Janeiro, Brazil.—License no. 116. Selling agents for the United States and Hawaii, Ernst Bischoff Co., Inc , 135 Hudson Street, New York, N. Y.; selling agents for Puerto Rico, Cesar A. Toro, Apartado 3854, Santurce P. R.
Fungus extracts.

DEATHS DURING WEEK ENDED AUG. 14, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug 14, 1937	Corresponding week, 1936
Data from 86 large cities in the United States:		
Total deaths	7,413	7,277
Average for 3 prior years	6,913	
Total deaths, first 32 weeks of year	287,462	288,223
Deaths under 1 year of age	545	491
Average for 3 prior years	491	
Deaths under 1 year of age, first 32 weeks of year	18,315	18,092
Data from industrial insurance companies:		
Policies in force	69,649,435	68,206,196
Number of death claims	11,290	11,456
Death claims per 1,000 policies in force, annual rate	8.5	8.8
Death claims per 1,000 policies, first 32 weeks of year, annual rate	10.3	10.4

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 21, 1937, and Aug. 22, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936
New England States:								
Maine				1	1	10	0	0
New Hampshire					4	10	0	0
Vermont					1	7	0	0
Massachusetts	3	2			27	46	1	1
Rhode Island		1				3	0	0
Connecticut	7		1		9	10	0	0
Middle Atlantic States:								
New York	19	18	[1] 1	([1])	127	96	7	3
New Jersey	5	10	4	6	36	44	0	1
Pennsylvania	14	18			97	39	8	5
East North Central States:								
Ohio	8	9	5	6	117	7	0	3
Indiana	3	10		7	11	4	1	2
Illinois	17	21	4	4	64	11	3	3
Michigan	10	6	1	1	36	8	1	0
Wisconsin	2	1	15	7	37	20	0	0
West North Central States:								
Minnesota	1	1	2		2		2	2
Iowa	1	2			5		0	3
Missouri	17	2	46	8	31	2	0	1
North Dakota	5		1				0	0
South Dakota	1						0	0
Nebraska	1	3			1	3	1	0
Kansas	8	5	1		5	5	2	2
South Atlantic States:								
Delaware						1	0	0
Maryland [2 3]	5	5			3	11	3	3
District of Columbia	3	2			5	3	3	1
Virginia [3]	17	9			1	19	3	1
West Virginia [3]	5	10	9		8	5	4	0
North Carolina [3 4]	23	18			27	4	3	3
South Carolina [4]	5	5	50	39	5	2	0	0
Georgia [4]	30	22					0	2
Florida [4]	5	3			10	11	2	-

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 21, 1937, and Aug. 22, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936
East South Central States:								
Kentucky	8	7	3	-------	22	4	2	1
Tennessee [4]	13	24	4	8	24	1	1	1
Alabama [4]	13	15	2	4	5	-------	2	0
Mississippi [2, 4]	9	16	-------	-------	-------	-------	1	0
West South Central States:								
Arkansas	8	4	2	1	6	-------	0	0
Louisiana	10	9	11	22	-------	2	2	3
Oklahoma [5]	2	10	1	6	1	-------	2	0
Texas [4]	36	25	45	28	51	26	4	1
Mountain States:								
Montana [3]	2	-------	-------	-------	13	-------	2	0
Idaho	2	-------	3	1	1	3	0	0
Wyoming	-------	1	-------	-------	2	-------	0	0
Colorado	2	2	-------	-------	6	2	0	4
New Mexico	3	6	-------	-------	35	6	0	0
Arizona	1	2	5	7	-------	5	1	0
Utah [2, 3]	1	2	-------	-------	8	1	0	0
Pacific States:								
Washington [3]	1	2	-------	-------	11	13	-------	0
Oregon [3]	1	1	13	3	1	5	0	1
California	19	19	9	12	23	49	6	2
Total	341	328	238	171	879	498	67	51
First 33 weeks of year	13,743	14,740	274,499	140,002	241,144	267,339	4,187	5,879

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936
New England States:								
Maine	6	0	4	5	0	0	0	2
New Hampshire	1	0	1	-------	0	0	0	1
Vermont	3	0	3	-------	0	0	1	0
Massachusetts	41	2	25	34	0	0	1	8
Rhode Island	0	0	2	4	0	0	1	0
Connecticut	6	1	7	3	0	0	2	1
Middle Atlantic States:								
New York	39	11	92	86	0	0	25	22
New Jersey	14	1	12	18	0	0	9	10
Pennsylvania	21	1	53	84	0	0	23	37
East North Central States:								
Ohio	22	8	62	48	1	0	51	13
Indiana	12	1	11	20	6	1	4	8
Illinois	54	15	66	66	10	0	24	28
Michigan	21	3	69	46	1	2	23	6
Wisconsin	6	0	33	60	1	0	1	2
West North Central States:								
Minnesota	10	1	19	12	5	9	2	3
Iowa	7	0	15	20	2	2	5	9
Missouri	13	1	44	10	7	0	37	22
North Dakota	0	0	4	14	1	1	0	1
South Dakota	1	2	9	2	1	3	0	1
Nebraska	15	0	2	6	0	0	0	4
Kansas	13	0	12	26	0	0	4	6
South Atlantic States:								
Delaware	0	0	-------	-------	0	0	1	2
Maryland [2, 3]	5	0	12	13	0	0	12	13
District of Columbia	8	0	2	2	0	0	3	3
Virginia [3]	1	4	10	11	0	0	17	20

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 21, 1937, and Aug. 22, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936	Week ended Aug. 21, 1937	Week ended Aug. 22, 1936
South Atlantic States—Continued.								
West Virginia [3]	5	0	11	19	0	0	21	10
North Carolina [3] [4]	5	0	5	16	0	0	26	21
South Carolina [4]	0	0	-------	1	0	0	18	16
Georgia [4]	5	1	9	10	0	0	19	26
Florida [4]	3	0	3	2	0	0	4	1
East South Central States:								
Kentucky	4	5	31	4	0	0	33	56
Tennessee [4]	1	24	-------	14	0	0	62	53
Alabama [4]	2	21	8	15	0	1	14	29
Mississippi [2] [4]	11	10	5	5	0	0	5	7
West South Central States:								
Arkansas	10	1	6	6	0	0	40	14
Louisiana	6	2	11	1	0	0	18	29
Oklahoma [5]	19	1	7	1	0	0	27	11
Texas [4]	51	1	32	11	0	0	78	50
Mountain States:								
Montana [3]	3	1	12	9	11	24	5	3
Idaho	0	1	-------	5	6	0	1	1
Wyoming	0	0	-------	6	0	4	0	0
Colorado	21	0	3	4	0	1	0	5
New Mexico	1	0	4	2	0	0	5	2
Arizona	0	0	2	1	0	0	4	6
Utah [2] [3]	0	0	38	5	0	1	0	1
Pacific States:								
Washington [3]	3	2	4	12	0	1	2	2
Oregon [3]	3	1	8	8	7	1	3	3
California	25	11	51	57	1	0	11	8
Total	492	133	819	804	60	51	642	571
First 33 weeks of year	3,432	1,454	164,859	178,715	7,974	5,955	8,185	7,280

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended Aug. 21, 1937, 10 cases, as follows: Maryland, 2, Virginia, 2; West Virginia, 1; North Carolina, 1, Montana, 1, Utah, 1; Washington, 1; Oregon, 1
[4] Typhus fever, week ended Aug. 21, 1937, 78 cases, as follows. North Carolina, 1; South Carolina, 3; Georgia, 35; Florida, 4; Tennessee, 1, Alabama, 17; Mississippi, 1; Texas, 16.
[5] Figures for Oklahoma for 1936 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
May 1937										
Puerto Rico	-------	23	195	675	12	-------	1	-------	-------	52
July 1937										
Illinois	11	109	31	27	1,076	1	48	486	41	61
Indiana	5	42	21	-------	588	-------	31	138	29	42
Michigan	6	64	-------	6	697	-------	16	793	8	20
Minnesota	3	7	-------	-------	23	-------	4	123	33	5
New York	37	109	-------	18	2,260	-------	84	613	0	55
Ohio	16	42	18	5	1,580	-------	103	314	5	82
Virginia	16	35	72	48	275	17	12	31	0	127
Wyoming	-------	-------	-------	-------	7	-------	3	20	0	2

Summary of monthly reports from States—Continued

	Cases
May 1937	
Puerto Rico:	
Chicken pox	6
Dysentery	22
Ophthalmia neonatorum	3
Tetanus	8
Whooping cough	10
July 1937	
Chicken pox:	
Illinois	475
Indiana	39
Michigan	418
Minnesota	118
New York	889
Ohio	238
Virginia	45
Wyoming	8
Colorado tick fever:	
Wyoming	4
Diarrhea and enteritis:	
Ohio (under 2 years)	27
Dysentery.	
Illinois (amoebic)	6
Illinois (bacillary)	26
Illinois (amoebic carriers)	12
Indiana (amoebic)	1
Michigan (amoebic)	1
Michigan (bacillary)	8
Minnesota (amoebic)	1
Minnesota (bacilliary)	1
New York (amoebic)	4
New York (bacillary)	36
Ohio (bacillary)	16
Dysentery and diarrhea:	
Virginia	1,343
Encephalitis, epidemic or lethargic:	
Illinois	6
New York	8
Ohio	4
Virginia	2
Wyoming	1
July 1937—Continued	
German measles:	
Illinois	42
Michigan	84
New York	136
Ohio	15
Granuloma:	
Illinois	2
Lead poisoning:	
Illinois	1
Ohio	84
Lymphogranuloma:	
Illinois	7
Mumps:	
Illinois	440
Indiana	26
Michigan	358
Ohio	75
Virginia	104
Wyoming	17
Ophthalmia neonatorum:	
Illinois	4
Minnesota	1
New York	15
Ohio	60
Paratyphoid fever:	
Illinois	4
Michigan	3
Minnesota	1
New York	13
Ohio	1
Virginia	3
Puerperal septicemia:	
Ohio	2
Rabies in animals:	
Illinois	36
Indiana	46
Michigan	8
New York	5
Rocky Mountain spotted fever:	
Illinois	4
Ohio	1
Virginia	15
Wyoming	4
July 1937—Continued	
Septic sore throat:	
Illinois	4
Michigan	10
Minnesota	14
New York	50
Ohio	50
Virginia	11
Wyoming	3
Tetanus:	
Illinois	4
Michigan	5
New York	6
Ohio	7
Trachoma:	
Illinois	13
Trichinosis:	
Illinois	3
New York	12
Ohio	2
Tularaemia:	
Illinois	3
Minnesota	7
Virginia	3
Wyoming	1
Typhus fever:	
New York	4
Undulant fever:	
Illinois	9
Indiana	5
Michigan	5
Minnesota	8
New York	19
Ohio	5
Virginia	4
Vincent's infection:	
Illinois	21
Michigan	17
New York	65
Whooping cough:	
Illinois	978
Indiana	330
Michigan	853
Minnesota	462
New York	1,855
Ohio	1,367
Virginia	586
Wyoming	97

PLAGUE INFECTION IN FLEAS, SAN BERNARDINO COUNTY, CALIF.

Dr. W. M. Dickie, Director of Public Health of California, reported on August 17, 1937, that plague infection had been proved, by animal inoculation, in a pool of 78 fleas taken from 28 *beecheyi* squirrels on July 29, 1937, in the Barton Flats area of San Bernardino County.

TYPHOID FEVER OUTBREAK IN PORTSMOUTH, OHIO

Under date of August 31, Dr. J. P. Leake, of the Public Health Service, reported the occurrence of 48 cases of typhoid, with 3 deaths, in Portsmouth, Ohio, since the middle of June, or about 5 times the usual incidence. In addition, 13 cases had been reported in the county. The source of the cases had not been determined.

WEEKLY REPORTS FROM CITIES

City reports for week ended Aug. 14, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	115	46	13	339	280	278	4	366	108	1,218	--------
Current week	75	23	13	339	325	237	6	359	83	1,232	--------
Maine:											
Portland	0	------	0	0	2	0	0	0	0	11	22
New Hampshire:											
Concord	0	------	0	0	1	0	0	0	0	0	10
Nashua	0	------	0	0	0	0	0	0	0	0	7
Vermont:											
Barre	0	------	0	0	0	0	0	1	0	0	4
Burlington	0	------	0	0	0	0	0	0	0	0	7
Rutland	0	------	0	0	0	0	0	0	0	0	4
Massachusetts:											
Boston	0	------	0	8	16	6	0	9	1	20	211
Fall River	0	------	0	0	1	1	0	2	0	18	33
Springfield	0	------	0	1	1	0	0	1	0	23	43
Worcester	0	------	0	0	4	2	0	2	0	8	43
Rhode Island:											
Pawtucket	0	------	0	0	0	1	0	0	0	0	15
Providence	1	------	0	0	4	3	0	1	1	35	53
Connecticut:											
Bridgeport	0	------	0	0	1	1	0	2	1	0	26
Hartford	0	------	0	4	2	2	0	1	0	4	39
New Haven	0	------	0	4	2	0	0	1	0	2	34
New York:											
Buffalo	1	------	0	2	4	2	0	10	0	25	124
New York	11	7	2	60	57	10	0	73	18	85	1,216
Rochester	0	------	0	2	3	1	0	0	1	5	51
Syracuse	0	------	0	0	2	3	0	0	0	33	45
New Jersey:											
Camden	1	------	0	0	3	1	0	1	1	0	28
Newark	0	------	0	3	2	1	0	5	0	18	82
Trenton	0	------	0	8	0	0	0	2	1	4	27
Pennsylvania:											
Philadelphia	3	------	0	2	11	13	0	19	5	37	419
Pittsburgh	1	------	0	20	16	9	0	9	3	61	124
Reading	0	------	0	5	2	0	0	1	0	2	22
Scranton	0	------	--------	1	-------	0	0	-------	0	2	--------
Ohio:											
Cincinnati	0	------	0	2	7	5	0	8	0	30	132
Cleveland	4	------	0	33	13	23	0	9	3	44	167
Columbus	0	------	0	3	2	3	0	4	2	8	67
Toledo	0	1	1	5	2	2	0	5	0	22	63
Indiana:											
Anderson	0	------	0	4	2	1	0	0	0	2	6
Fort Wayne	0	------	0	0	1	1	0	1	0	0	22
Indianapolis	0	------	0	6	6	4	1	3	0	19	94
Muncie	0	------	0	1	1	1	0	0	0	0	13
South Bend	0	------	0	1	2	0	0	0	0	1	19
Terre Haute	0	------	0	0	0	0	0	0	0	0	20
Illinois:											
Alton	0	------	0	0	0	0	0	0	0	0	16
Chicago	6	4	3	49	23	37	0	32	3	76	646
Elgin	0	------	0	0	0	0	0	0	0	5	5
Moline	0	------	0	0	0	0	0	1	0	6	16
Springfield	0	------	0	3	0	1	0	0	0	3	14
Michigan:											
Detroit	3	------	0	29	13	14	0	21	3	80	221
Flint	0	------	0	0	3	6	0	0	6	9	21
Grand Rapids	0	------	0	10	0	1	0	0	0	31	28
Wisconsin:											
Kenosha	0	------	0	0	0	1	0	0	0	0	8
Milwaukee	0	1	1	8	0	10	0	0	0	47	82
Racine	0	------	0	0	0	3	0	0	0	0	10
Superior	0	------	0	0	0	2	0	0	0	5	8

City reports for week ended Aug. 14, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Minnesota:											
Duluth	0		0	0	0	5	0	1	0	10	22
Minneapolis	0		0	1	0	4	0	1	0	8	85
St. Paul	0		0	0	2	1	0	2	0	40	52
Iowa:											
Cedar Rapids	0			1		0	0		0	1	
Davenport	0			0		0	0		0	0	
Des Moines	0			0		1	0		0	0	31
Sioux City	0			0		0	0		0	2	
Waterloo	0			1		0	0		1	2	
Missouri:											
Kansas City	0		0	1	3	3	0	2	1	2	83
St. Joseph	2		0	0	2	3	1	2	0	0	34
St. Louis	3		0	10	8	7	1	10	5	22	189
North Dakota:											
Fargo	0		0	0	1	0	0	0	0	13	6
Grand Forks	0			1		0	0		0	0	
Minot	0		0	1	0	0	0	0	0	0	5
South Dakota:											
Aberdeen	0			0		0	0		0	2	
Sioux Falls	0		0	0	0	0	0	0	0	0	6
Nebraska:											
Omaha	0		0	1	0	0	0	2	0	2	57
Kansas:											
Lawrence	0		0	1	0	0	0	0	0	1	5
Topeka	0		0	0	4	0	0	0	0	20	24
Wichita	0	1	1	1	2	1	0	1	0	10	35
Delaware:											
Wilmington	0		0	0	2	0	0	1	0	1	34
Maryland:											
Baltimore	2		1	1	12	5	0	18	3	70	202
Cumberland	0		0	0	0	0	0	0	0	2	12
Frederick	0		0	0	0	0	0	0	0	0	3
Dist. of Col.:											
Washington	6		0	6	6	4	0	8	6	7	142
Virginia:											
Lynchburg	1		0	1	1	0	0	0	0	2	14
Richmond	0		0	3	0	0	0	1	0	1	46
Roanoke	0		0	0	0	2	0	0	0	0	7
West Virginia:											
Charleston	0		0	0	6	0	0	2	1	0	42
Huntington	0			0		0	0		0	0	
Wheeling	0		1	0	0	1	0	1	1	10	21
North Carolina:											
Raleigh	0		0	0	0	0	0	0	1	2	12
Wilmington	0		0	0	0	0	0	0	1	9	8
Winston-Salem	0		0	1	1	0	0	1	0	8	11
South Carolina:											
Charleston	0	5	0	0	2	2	0	0	1	2	13
Florence	1		0	0	0	0	0	3	1	0	11
Greenville	0		0	0	1	1	0	0	0	1	11
Georgia:											
Atlanta	2		0	0	4	2	0	0	0	19	88
Brunswick	0		0	0	0	0	0	0	0	0	2
Savannah	0	1	0	0	1	0	0	4	1	5	33
Florida:											
Miami	1		0	4	0	0	0	1	1	0	35
Tampa	1		0	0	1	1	0	1	0	3	21
Kentucky:											
Covington	0		0	1	2	0	0	0	0	11	23
Lexington	0		0	0	1	0	0	1	0	0	21
Louisville	1		0	14	3	9	0	1	0	43	55
Tennessee:											
Knoxville	0		0	0	2	2	0	2	2	1	32
Memphis	4		1	9	0	1	0	8	1	14	77
Nashville	0		1	0	0	0	0	3	1	7	53
Alabama:											
Birmingham	2		0	1	3	0	0	1	0	2	61
Mobile	0		0	0	0	0	0	0	0	0	24
Montgomery	0			0		0	0		0	0	

City reports for week ended Aug. 14, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Arkansas:											
Fort Smith	1			0		0	0		0	0	
Little Rock	1		0	1	5	1	0	3	0	3	11
Louisiana:											
Lake Charles	0			0		0	0		0	0	1
New Orleans	7		0	0	9	1	0	13	1	9	141
Shreveport	0		0	0	2	0	0	4	0	0	38
Oklahoma:											
Muskogee	0		0	0	0	1	0	0	0	0	5
Oklahoma City	0		0	0	8	1	0	0	1	0	52
Tulsa	3			1		0	0		0	5	
Texas:											
Dallas	3		0	1	0	1	0	2	1	7	52
Fort Worth	0		0	0	1	1	0	0	2	8	50
Galveston	0		0	0	1	0	0	0	0	0	11
Houston	2		0	0	6	2	0	2	1	0	81
San Antonio	1		0	0	3	1	0	9	1	0	48
Montana:											
Billings	0		0	0	0	0	0	0	0	2	8
Great Falls	0		0	0	0	0	0	1	0	2	10
Helena	0		0	0	0	1	0	0	0	0	2
Missoula	0		0	0	0	1	0	0	0	0	2
Idaho:											
Boise	0		0	0	1	0	1	0	0	0	4
Colorado:											
Colorado Springs	0		0	0	1	0	0	1	0	0	13
Denver	1		1	14	3	2	0	4	1	14	76
Pueblo	0		0	0	1	0	0	2	0	0	13
New Mexico:											
Albuquerque	0		0	0	0	1	0	1	0	1	12
Utah:											
Salt Lake City	0		0	16	3	4	0	0	1	2	35
Washington:											
Seattle	0		0	2	0	0	0	2	0	28	82
Spokane	0	1	1	2	1	0	0	2	0	11	29
Tacoma	0		0	0	2	0	0	0	0	0	22
Oregon:											
Portland	6		0	1	0	2	0	2	1	1	75
Salem	0	1		1		0	0		0	0	
California:											
Los Angeles	4	2	0	2	13	9	2	15	4	82	274
Sacramento	2	1	0	1	3	2	0	2	1	3	37
San Francisco	0		0	1	7	4	0	10	0	39	154

City reports for week ended Aug. 14, 1937—Continued

State and city	Meningococcus meningitis		Polio-mye-litis cases	State and city	Meningococcus meningitis		Polio-mye-litis cases
	Cases	Deaths			Cases	Deaths	
Maine:				Missouri:			
Portland	0	0	4	Kansas City	0	0	8
Massachusetts:				St. Joseph	0	1	0
Boston	0	0	8	Nebraska:			
Fall River	0	0	[1] 1	Omaha	0	0	14
Springfield	2	1	0	Maryland:			
Worcester	0	0	3	Baltimore	0	0	6
Rhode Island:				District of Columbia:			
Providence	0	0	1	Washington	0	0	1
New York:				West Virginia:			
Buffalo	1	1	1	Charleston	2	1	0
New York	2	1	8	Kentucky:			
Syracuse	0	0	2	Louisville	0	0	1
New Jersey:				Alabama:			
Newark	1	0	2	Birmingham	1	0	0
Pennsylvania:				Mobile	1	1	0
Philadelphia	2	1	4	Arkansas:			
Ohio:				Little Rock	0	0	1
Cincinnati	1	1	5	Oklahoma:			
Cleveland	0	0	5	Muskogee	0	0	5
Columbus	0	0	5	Oklahoma City	1	0	2
Toledo	0	0	1	Tulsa	0	0	2
Indiana:				Texas:			
Indianapolis	0	0	3	Dallas	0	0	1
Muncie	0	0	1	Fort Worth	0	0	3
South Bend	0	0	1	Galveston	0	0	1
Illinois:				Houston	1	0	5
Alton	1	0	0	Colorado:			
Chicago	0	0	21	Colorado Springs	0	0	1
Michigan:				Denver	1	1	0
Detroit	0	0	13	New Mexico:			
Grand Rapids	0	0	1	Albuquerque	0	0	1
Wisconsin:				Utah:			
Milwaukee	0	0	6	Salt Lake City	0	0	1
Minnesota:				California:			
Duluth	0	0	1	Los Angeles	0	0	11
Minneapolis	0	0	2				
Iowa:							
Des Moines	0	0	2				
Sioux City	0	0	2				

[1] Preparalytic.

Encephalitis, epidemic or lethargic.—Cases: Cleveland, 1; Columbus, 1; Houston 1.

Pellagra.—Cases: Chicago, 1; Baltimore, 1; Atlanta, 1; Savannah, 1; Miami, 1; Nashville, 1; Birmingham, 1; Fort Smith, 1; New Orleans, 2; Dallas, 1; San Francisco, 1.

Typhus fever.—Cases: Charleston, S. C., 1; Greenville, 1; Atlanta, 2; Savannah, 5; Miami, 1; Birmingham, 1; Montgomery, 1; Houston, 1; Deaths: Greenville, 1; Savannah, 1.

FOREIGN AND INSULAR

CUBA

Habana—Communicable diseases—4 weeks ended July 31, 1937.—During the 4 weeks ended July 31, 1937, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	12		Rabies	1	1
Malaria	[1] 19		Tuberculosis	18	1
Poliomyelitis	[1] 1	1	Typhoid fever	[1] 19	5

[1] Includes imported cases.

Habana—Communicable diseases—Fiscal year ended June 30, 1937.—During the fiscal year ended June 30, 1937, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	July-December 1936		January-June 1937		Total	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Cerebrospinal meningitis			1		1	
Diphtheria	75	4	141	6	216	10
Dysentery (bacillary)	55	11			55	11
Epidemic encephalitis	1	1			1	1
Leprosy	5	1	4		9	1
Malaria	659	17	238	10	897	27
Measles				1		1
Poliomyelitis	23	2	24		47	2
Scarlet fever	1		13		14	
Tuberculosis	90	19	108	14	198	33
Typhoid fever	364	81	300	44	664	125

NOTE.—Imported cases are included in the above figures.

FINLAND

Communicable diseases—June 1937.—During the month of June 1937, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	223	Scarlet fever	798
Dysentery	1	Typhoid fever	49
Influenza	1,204	Typhus fever	1
Paratyphoid fever	147	Undulant fever	4
Poliomyelitis	4		

JAMAICA

Communicable diseases—4 weeks ended August 7, 1937.—During the 4 weeks ended August 7, 1937, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chicken pox		9	Leprosy		4
Diphtheria	2		Scarlet fever		2
Dysentery	3	2	Tuberculosis	32	70
Erysipelas		2	Typhoid fever	8	68

SWEDEN

Notifiable diseases—June 1937.—During the month of June 1937, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	7	Scarlet fever	1,106
Diphtheria	29	Syphilis	20
Dysentery	13	Typhoid fever	15
Gonorrhea	859	Undulant fever	14
Paratyphoid fever	28	Weil's disease	1
Poliomyelitis	[1] 75		

[1] Includes 17 cases nonparalytic at time of notification.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for August 27, 1937, pages 1191-1205. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued September 24, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

China—Hong Kong.—During the week ended August 7, 1937, 21 cases of cholera, with 19 deaths, were reported in Hong Kong, China.

India—Northwest Frontier Province.—During the week ended August 14, 1937, 100 cases of cholera were reported in the Northwest Frontier Province, India.

Plague

China—Manchuria.—Information dated August 18, 1937, states that an outbreak of plague is reported from West Hsingan (Khingan) and Southern Lungkiang Provinces, Manchuria.

Hawaii Territory—Island of Hawaii—Hamakua District—Hamakua Mill Co. Sector.—Five rats found during the period August 10–12, 1937, in Hamakua Mill Co. Sector, Hamakua district, island of Hawaii, Hawaii Territory, have been proved plague infected.

United States—California.—A report of plague infection in fleas in San Bernardino County, Calif., appears on page 1241 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

Mexico.—During the month of May 1937, smallpox has been reported in Mexico as follows: Aguascalientes, Aguascalientes State, 1 case; Ciudad Juarez, Chihuahua State, 2 cases, 1 death; Mexico, D. F., 41 cases, 8 deaths; Queretaro, Queretaro State, 10 cases, 5 deaths; Toluca, Mexico State, 1 case. During the month of June 1937, 15 deaths from smallpox were reported in Mexico, D. F.

Typhus Fever

Mexico.—During the month of May 1937, typhus fever was reported in Mexico as follows: Aguascalientes, Aguascalientes State, 2 cases; Guanajuato, Guanajuato State, 4 cases, 1 death; Mexico, D. F., 14 cases, 3 deaths; Pachuca, Hidalgo State, 1 case, 1 death; Queretaro, Queretaro State, 2 cases, 2 deaths; San Luis Potosi, San Luis Potosi State, 2 cases, 1 death; Toluca, Mexico State, 2 cases. During the month of June 1937, five deaths from typhus fever were reported in Mexico, D. F.

Yellow Fever

Brazil—Para State.—Yellow fever has been reported in Para State, Brazil, as follows: Bemfica, June 28, 1 death; Cameta, July 1, 1 death.

Colombia.—Yellow fever has been reported in Colombia as follows: Muzo, Boyaca Department, June 14, 1 case, June 30, 1 case; Yacopi, Cundinamarca Department, June 16, 1 death; Rionegro, Santander Department, June 30, 1 death.

Gold Coast.—On August 13, 1937, one case of yellow fever was reported in Adeiso, and one case in Nuaso, Gold Coast.

Ivory Coast—Agboville.—On August 11, 1937, one case of yellow fever was reported in Agboville, Ivory Coast.

Nigeria.—On August 13, 1937, three cases of yellow fever were reported in Nigeria, no location being given.

Senegal—Tamba-Counda.—On August 16, 1937, one suspected case of yellow fever was reported in Tamba-Counda, Senegal.

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, Jr., *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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FURTHER STUDIES ON THE MINIMAL THRESHOLD OF CHRONIC ENDEMIC DENTAL FLUOROSIS[1]

By H. TRENDLEY DEAN, *Dental Surgeon* and ELIAS ELVOVE, *Senior Chemist, United States Public Health Service*

Late in 1933 an investigation was begun to determine what constitutes a permissible amount of fluoride in a domestic water supply. A mean annual fluoride content of the domestic water supply was determined for each of a group of 10 cities. Twelve consecutive monthly water samples were sent by each of these cities to the National Institute of Health for chemical analyses. The results of the chemical study revealed the following range in fluoride concentration, the mean annual fluoride content of each common water supply being expressed in parts per million of fluorine (F): Pueblo, Colo., 0.6; Big Spring, Tex., 0.7; Mullins, S. C.. 0.9; Monmouth, Ill., 1.7; Galesburg, Ill., 1.8; Colorado Springs, Colo., 2.5; Plainview, Tex., 2.9; Amarillo, Tex., 3.9; Conway, S. C., 4.0; and Lubbock, Tex., 4.4. Clinical examinations were recorded in each of these cities and the results of the investigation were published in two reports (*1*, *2*).

A careful analysis of these and subsequent data (*3*) indicated a definite quantitative relationship between the fluoride concentration and the clinical manifestations of dental fluorosis. There was an orderly uniformity in the group response to the fluoride concentration of the communal water supply with regard both to the incidence and the percentage distribution of severity, particularly the latter. With this fact demonstrable, it seemed desirable to focus further attention on the minimal threshold of toxicity, or the maximum amount of fluoride permissible in a domestic water supply.

PRESENT STUDY

For this study, four additional communities were selected in the autumn of 1935 for detailed quantitative study. These cities were Clovis, N. Mex., Webster City, Iowa, East Moline, Ill., and Junction

[1] From Division of Infectious Diseases and Division of Chemistry, National Institute of Health.

City, Kans. A report of the survey of these four cities, prefaced by a description of their common water supplies, follows:

DESCRIPTION OF THE COMMON WATER SUPPLIES [3]

Clovis, N. Mex.—The common water supply is obtained from three 32-inch, 340-foot wells operated by the New Mexico Utilities Co. All wells are cased their entire depth and apparently obtain water from the "third stratum". There are no "strainers" or perforations in the casings which would permit mixing of water from the first or second stratum. In 1933 the water level stood at about 250 feet below the surface, and prior to that time had been stationary; since then it has fallen 9 feet.

One well was drilled in 1931, one in 1926, and one (city well no. 1) prior to October 1925, when the present operators took over the property from the city. Topographically the wells are located in a triangulated outline, the vertices, marking the location of the wells, being about 200 to 250 feet apart.

Prior to 1925, the municipal water supply was obtained from two "big" wells, 32 inches in diameter and 340 feet deep, known as "city well no. 1" and "city well no. 2", and from four "small" wells, approximately 300 feet deep, one 6 inches in diameter, the other three, 4 inches in diameter. The four "small" wells were abandoned in 1927; "city well no. 2" was abandoned in 1930. Between October 1925 and 1927 about 70 percent of the water supply was obtained from the two 32-inch, 340-foot wells taken over from the city. The remainder came from the 4 "small" wells.

Webster City, Iowa.—The common water supply is obtained from two deep wells which differ markedly in depth. They are municipally operated. No. 1 is a 10-inch well put in service in 1924 and has been in continuous use since that date. This well is 1,805 feet deep and cased to a depth of 1,520 feet. There are no "slots" or perforations in the casing which would permit mixture of water from higher levels. Water is apparently obtained from three water-bearing sands, 46 feet, 56 feet, and 65 feet in thickness, respectively, located between the 1,605- and 1,790-foot levels. The highest of these aquiferous sands is approximately 150 feet below the St. Peter sandstone. It might be noted that the drilling log indicated that no water was obtained from the St. Peter sandstone in this particular locality.

Well no. 2 is a 12-inch, 120-foot well, likewise drilled in 1924 and in continuous use since that date, with the exception of the period between February 1930 and November 1, 1932. During 1932 this well was deepened from 110 feet to 120 feet. According to the water superintendent, well no. 1 furnishes about two-thirds of the city water, the remainder being supplied by well no. 2.

The water superintendent states that the 12 monthly samples sent to the National Institute of Health were taken from a tap on the high surface pump discharge. This tap is located on a line between the "clear" reservoir and the distribution mains and pressure storage tanks. A water sample from this source is representative of that used by the inhabitants. Samples were generally collected in the forenoon. As a rule, well no. 1 is pumped from midnight to noon and well no. 2 from noon to midnight.

A large number of individual shallow wells are used in the East School district.

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[3] The description and data concerning these municipal water supplies were furnished by Messrs. A. J. Whiting, vice president, New Mexico Utilities Co., Clovis, N. Mex.; E. R. Compton, city manager, Webster City, Iowa; Arnold Neihaus, East Moline, Ill., and Arthur Rathert, water superintendent, Junction City, Kans. The authors are likewise indebted to these officials for their assistance in collecting and forwarding the monthly water samples.

East Moline, Ill.—The common water supply of East Moline is obtained from two deep wells, municipally operated. Well no. 1 was installed in 1895, and at that time was 1,300 feet in depth; well no. 2 was drilled in 1911 to a depth of 1,371 feet. In 1913 both wells were deepened, no. 1 to a depth of 1,532 feet, no. 2 to 1,850 feet. There had been no changes in the physical set-up between 1913 and the date of the survey, November 1936. Both wells furnish approximately equal amounts to the city supply. Water from the two wells is pumped by air lift into a collecting reservoir, from which it is pumped into the distribution system. Two elevated steel tanks connected with the distribution system have a capacity of 100,000 and 500,000 gallons, respectively.

No local information was obtainable as to the depth of casings or strata from which water is apparently being obtained. During July and August it has been customary to augment the East Moline supply by obtaining some water from the nearby village of Silvis. This supplemental supply amounts to about one-third of the water used by the inhabitants of East Moline during these 2 months. The Silvis supply is obtained from one deep well, 1,985 feet in depth, and from one shallow well, 35 to 40 feet deep. The city clerk of East Moline states, however, that the monthly samples forwarded to the National Institute of Health should not show the possible effects of this change as the East Moline samples were in all cases collected from the East Moline Reservoir. Inasmuch as the distribution systems of the two communities connect at a point some distance from the reservoir, whatever water East Moline might obtain from Silvis should not pass through the East Moline Reservoir.

Junction City, Kans.—The common water supply of Junction City is obtained from three 60-foot wells, installed in August 1924 and in constant use since that date. These wells are concrete cased; the outside casing is 24 inches in diameter, the inside 18 inches. There are strainers in the lower 20 feet of the casing, the upper 40 feet being plain concrete casing. All three wells are located near the Republican River; well no. 1 is about 100 feet from the river, well no. 2 about 200 feet, while well no. 3 is located in the old Republican River Basin, which is now about 125 feet from the present river bank. Each well has a direct-connected deep-well turbine pump and motor. The water is pumped into a collection reservoir from which point the high-service pumps deliver the water to the city distribution system. On the suction side of the high service pumps, chlorine is introduced in varying amounts.

The drilling log indicates that the wells pass through about 25 feet of clay and 15 feet of very fine gravel, while the lower 20 feet is composed of fine to coarse gravel resting on a limestone stratum. The water level in the three wells correlates with the height of water in the nearby Republican River.

METHOD OF CLINICAL SURVEY [3]

Standards of clinical survey, previously described (*1*), were followed. In this particular study the age group consisted of the 9-, 10-, and 11-year old children, the age grouping being by last birthday. In order to confine the study group exclusively to those children constantly exposed to the risk of the disease, all children who stated that they had not lived in the city continuously since birth (30 days in a calendar year excepted), or had not used the municipal water exclusively, were

[3] The field survey at Clovis, N. Mex., was made during March 1936, that at Junction City, Kans., in May 1936, and the surveys at East Moline, Ill., and Webster City, Iowa, were made during November 1936.

eliminated. The remainder were then further questioned as to their residence and drinking-water history. This cross-questioning often revealed breaks in continuity of residence, such as living for a time at some nearby town or farm, or vacations away from home in excess of 30 days. There are, furthermore, some instances in which children lived in the community continuously but had obtained their domestic water from other than the public supply. Children whose histories indicated any of these discontinuities were eliminated from further study.

All examinations were made in a good light with the child facing a window. At Webster City, East Moline, and Junction City, mouth mirrors free from blemishes and new explorers (SSW no. 5, or equal) were used in making the examinations. In these three cities, in addition to mottled enamel, other defects of the enamel such as caries, present or past (fillings), pits and fissures, hypoplasias, etc., were recorded on an individual record form, reproduced in a previous report (*1*).

At Clovis, the diagnosis of the degree of mottled enamel severity was based on a careful visual examination without the aid of mouth mirrors. The observations were recorded by the "cross five" method on a tally sheet designed for mottled-enamel surveys. The signs of chronic endemic dental fluorosis are so objective that little variation in incidence is noted in using either one or the other of these methods.[4] In this particular city the recording of the detailed results of each examination on an individual record form and then verifying the history as given by each child by an interview with the child's parent would have been purposeless in view of the interfering variable in the physical set-up of the water supply. There is no object in expending time and effort in obtaining the data upon which an "actual" mottled enamel index is computed when major changes in the water supply contravene subsequent correlation with the chemical findings. Whether or not the four "small" wells abandoned in 1927 and "city well no. 2," abandoned in 1930, contained a greater or lesser amount of fluoride than the present supply, is, of course, at this time conjectural. The computation of an "actual" mottled-enamel index of a community is justified only in such communities as possess the requisites for quantitative evaluation (*2*).

[4] For instance, in 1935 a test was made of the two methods at Colorado Springs, Colo. In this city there are 10 public grade schools, 5 east of Monument Creek and 5 west of the creek. In the 5 schools east of Monument Creek there were seventy-nine 9-year-old children who stated that they had resided in the community continuously since birth and had always used the city water supply. An examination of this group using a mouth mirror and explorer disclosed an incidence of 67 percent. An examination of 69 children of the same age and comparable to the first group as to residence and water history in the 5 schools west of Monument Creek, using the method of careful visual examination without mouth mirrors, showed an incidence of 68 percent.

Following the examinations at Webster City, East Moline, and Junction City, the home of each child was visited and the information recorded on the schedule (*1*) under "Water history" was carefully rechecked by an interview with the child's parent for the purpose of later computing an "actual" mottled-enamel index of the community. This recheck often revealed additional inaccuracies in residence or water supplies which the child either did not know or had forgotten. Under the conditions of this survey in the three cities above mentioned, it was possible to find only 19.4, 27.9, and 26.2 percent, respectively, of the children who could demonstrate a continuous residence and an exclusive use of the city water during their lifetime. A previous survey (*1*) of four other cities, but limited to the 9-year-old group, showed 20.4, 20.8, 21.3, and 22.8 percent with verified continuous residence and constant use of the communal water supply. The striking fact that such a high percentage of school children shows discontinuities in residence or noncontinuous use of a common water supply cannot be overstressed in mottled-enamel surveys made for the purpose of determining the incidence associated with a particular fluoride concentration or of subsequent computation of a mottled-enamel index. A survey of a group of school children, without adjusting for this time-of-exposure factor, naturally results in a rate of affection considerably less than the actual rate.

The results obtained are summarized in tables 1, 2, and 3.

TABLE 1.—*Summary of data with relation to continuity of residence and concomitant use of the communal water supply*

	Clovis, N. Mex	Webster City, Iowa	East Moline, Ill.	Junction City, Kans.
(1) Number of grade public schools in city	2	5	5	3
(2) Number of grade public schools in which examinations were held	2	5	5	3
(3) Number of 9-, 10-, and 11-year old pupils in attendance in (2) on date of examination	424	242	336	[1] 355
(4) Number of pupils in (3) whose histories on questioning indicated constant residence and concomitant use of communal water supply and who were examined	138	72	110	115
(5) Percentage of age group present examined under (4)	32.5	29.7	32.7	32.4
(6) Number of schedules eliminated by house-to-house recheck	....	25	16	22
(7) Percentage of total present showing constant residence and water history	....	19.4	27.9	26.2

[1] There were actually 415 children present, but about 20 in each age group (60 in all) were children from Fort Riley, a nearby military reservation; 355 represent approximately the actual number of Junction City residents present.

TABLE 2.—*Distribution according to severity of dental fluorosis in those examined in item 4 of table 1*

City	Number of children examined	Children classified according to mottled enamel diagnosis							Incidence per 100 children
		Normal	Questionable	Very mild	Mild	Moderate	Moderately severe	Severe	
		Number							
Clovis, N. Mex.	138	18	22	33	49	15	1	0	71.0
Webster City, Iowa	72	47	6	16	3	0	0	0	26.4
East Moline, Ill.	110	61	22	20	6	1	0	0	24.5
Junction City, Kans.	115	110	3	2	0	0	0	0	1.7
		Percent							
Clovis, N. Mex.	138	13.1	15.9	23.9	35.5	10.9	0.7	0	71.0
Webster City, Iowa	72	65.3	8.3	22.2	4.2	0	0	0	26.4
East Moline, Ill.	110	55.5	20.0	18.2	5.4	0.9	0	0	24.5
Junction City, Kans.	115	95.7	2.6	1.7	0	0	0	0	1.7

TABLE 3.—*Distribution according to severity of dental fluorosis in those remaining after recheck (see item 6 of table 1)*

Cit	Number of children examined	Children classified according to mottled enamel diagnosis							Incidence per 100 children
		Normal	Questionable	Very mild	Mild	Moderate	Moderately severe	Severe	
		Number							
Clovis, N. Mex.[1]	---	---	---	---	---	---	---	---	---
Webster City, Iowa	47	26	5	13	3	0	0	0	[2] 34.0
East Moline, Ill.	94	51	19	18	5	1	0	0	25.5
Junction City, Kans.	93	90	1	2	0	0	0	0	2.1
		Percent							
Clovis, N. Mex.	---	---	---	---	---	---	---	---	---
Webster City, Iowa	47	55.3	10.7	27.7	6.3	0	0	0	34.0
East Moline, Ill.	94	54.3	20.2	19.1	5.3	1.1	0	0	25.5
Junction City, Kans.	93	96.8	1.1	2.1	0	0	0	0	2.1

[1] Clovis data was not rechecked; see text.
[2] The increase in incidence of affection from 26.4 to 34.0 percent as a result of the house-to-house recheck is the largest yet recorded in surveys of this type. The large number of shallow wells in use no doubt contributes to this increase.

RESULTS OF CHEMICAL ANALYSIS

As has been noted previously, samples of the waters were obtained monthly. The fluoride content was estimated colorimetrically by means of the zirconium-alizarin reagent (*4*). The results obtained are given in table 4.

TABLE 4.—*Fluoride (F) content of monthly samples*

Month and year	Clovis	Webster City	East Moline	Junction City
	Parts per million			
1935				
December	2.1	1.6	1.6	0.7
1936				
January	2 2	1.5	1.6	.7
February	2 3	1.5	1 6	.7
March	2.3	1.6	1.5	.7
April	2.3	1.6	1.5	.7
May	2.3	1 6	1.5	.7
June	2.1	1.6	1.6	.7
July	2.1	1.6	1.6	.7
August	2 2	1.6	1.5	.7
September	2 2	1.5	[1] 1.0	.6
October	2.1	1.5	1.6	.6
November	2.1	1.5	1.6	.6
Mean annual fluoride content	2.19	1.56	[1] 1.51	.67

[1] When the abrupt change in fluoride content of the September sample was noted, inquiry was made as to a possible explanation. Mr. Arnold Neihaus, city clerk of East Moline, furnished the information that 1 of the wells was not used during that time on account of a broken pump In order to have information as to possible fluctuation in fluoride content on account of the use of only 1 of the wells, samples from each well were sent by Mr Neihaus for analysis. These results showed that the water from the well used when the September sample was taken had a fluoride (F) content of 1 0 part per million, while the water from the other well showed a fluoride (F) content of 1 6 parts per million According to local information, each well contributes about equal amounts to the municipal supply But as indicated by the fluoride figures, the samples sent us apparently were chiefly representative of one or the other of the 2 wells and not an equal mixture of the 2 Hence, the arithmetical mean annual fluoride content might be in the neighborhood of 1.3 parts per million instead of the 1.5 parts per million shown in table 4.

Similar determinations (on single samples) of the fluoride content of the water from each of the 2 wells supplying Webster City, showed that the fluoride (F) content of one was 1 8 parts per million, while that of the other was 1 3 parts per million.

As was customary in other quantitative surveys, analyses were made of constituents of the water other than the fluorides. Results of the chemical analyses of the waters are given in table 5.

TABLE 5.—*Analyses of the waters[1] used*

	Clovis	Webster City	East Moline	Junction City
	Parts per million			
Residue on evaporation	265.8	729.0	1,128.6	400.5
Loss on ignition	23 3	126.8	46.5	36 2
Fixed residue	242.5	602 2	1,082.1	364.3
Silica (SiO_2)	35.9	14 5	12.2	27.7
Iron (Fe)	02	.18	.08	.04
Aluminum (Al)	.2	.4	.1	.3
Calcium (Ca)	25.7	105.5	54.3	83.5
Magnesium (Mg)	21.8	50 5	25.7	17.9
Sodium and potassium (calculated as Na)	40.2	60 2	309.3	29.7
Bicarbonate (HCO_3)	234.9	406.9	308 0	294.6
Sulphate (SO_4)	24.2	235.6	290 9	45.9
Nitrate (NO_3)	7.9	3.5	3.0	4.8
Chloride (Cl)	16.5	25.0	259.0	31.0
Fluoride (F)	2.2	1.5	1.4	.7
Phosphate (PO_4)	0	.2	0	.2
Boron (B)	0	0	0	0

[1] The sample of water from Clovis was collected in September 1935, the East Moline and Webster City samples in October 1935, and the Junction City sample in November 1935.

Assistant Chemist C. G. Remsburg carried out the determinations other than fluoride and boron, using mostly the methods given in the Standard Methods of Water Analysis of the American Public Health Association. The boron determinations were made essentially by the method of Foote (*6*).

Check analyses on the mineral content, comprising determinations of total solids, alkalinity, chloride, and sulphate, were made on each of the monthly samples. The results indicated that the gross mineral composition was practically uniform in all of the monthly water samples from each community, with the exception of the September sample from East Moline. (See footnote to table 4.)

DISCUSSION

There are numerous references in the literature to surveys of mottled enamel areas in which little data is submitted relative to the size of the sample, the age distribution, or the continuity of exposure of the group upon which inferences are postulated. In surveys of communities with populations of 1,500 or less, the adequacy of the sample becomes one of paramount importance. Even though all 9-, 10-, 11-, and 12-year-old children of continuous residence and a history of constant use of the common water supply are examined, the group is generally so small that extreme caution is warranted in interpreting the results. Comments relative to a few of these observations follow.

EFFECT ON INCIDENCE OF AGE GROUPING OF SAMPLE

Analyses of data from numerous surveys indicate that when dealing with fluoride (F) concentrations between 1.0 and approximately 2.5 parts per million, an examination of the 9-year-old children exclusively shows a lower incidence than when the examination includes the 9-, 10-, and 11-, or the 9-, 10-, 11-, and 12-year-old children. A possible explanation of this phenomenon has previously been suggested (*3*):

Two related factors are probably the cause of this somewhat lower incidence in a survey limited to the 9-year-age group. First, in endemic areas of relatively low fluoride concentration (less than 2 parts per million) there is, in a fair proportion of the children of comparable and constant residence and water history, a tendency to show the milder forms of mottled enamel only on the bicuspids and second molars, a group of teeth which, according to Kronfeld (Development and Calcification of the Human Deciduous and Permanent Dentition. The Bur, March 1935) begin their calcification at a somewhat later date than the incisor-first molar group. This manifestation of mild dental fluorosis in teeth calcified at a somewhat later date is suggestive of a cumulative action of fluorine. Second, based on an analysis of the 162 schedules of the Colorado Springs-Pueblo survey (*1*) only about 1 percent of the permanent second molars, 7.2 percent of the second bicuspids, and 20.5 percent of the first bicuspids were erupted in the 9-year-age group. It follows, therefore, that certain 9-year-old children are necessarily classified as normal on the basis of the absence of mottled enamel on the incisor-first molar group when, if the same individual were examined a year or two later, it might show objective signs of mottled enamel on the bicuspid-second molar group and be so classified.

Illustrations of this tendency may be seen in table 6.

TABLE 6.—*Difference in the percentage incidence between samples composed of 9-year-old children exclusively and samples consisting of 9-, 10-, and 11-year-old children*

City and State	Mean annual fluoride content (p. p. m.)	9-year-old children		Composite of 9-, 10-, 11-year-old children		Difference in incidence
		Number examined	Incidence per 100 children	Number examined	Incidence per 100 children	
Pueblo, Colo.	0.6	83	2.4			
Junction City, Kans.	.7	38	2.6	115	1.7	−0.9
East Moline, Ill.	1.5	42	19.0	110	24.5	+5.5
Webster City, Iowa	1.6	33	15.1	72	26.4	+11.3
Monmouth, Ill.	1.7	38	42.1			
Clovis, N. Mex.	2.2	45	57.7	138	71.0	+13.3
Colorado Springs, Colo.	2.5	79	67.1			
Plainview, Tex.	2.9	30	86.6	77	87.0	+.4
Amarillo, Tex.	3.9	77	87.0	229	89.5	+2.5
Conway, S. C.	4.0	23	86.9	59	88.1	+1.2
Lubbock, Tex.	4.4	70	95.7	164	97.6	+1.9

NOTE.—In the observations listed in table 6, the histories elicited from each child by careful cross-questioning indicated constant residence and continuous use of the common water supply. This is the standard, followed in recording the data used in determining the "approximate mottled enamel index" (6). The variation in the incidence between this method and that of verifying each history by an interview with the child's parent (actual mottled enamel index) is generally of minor importance. In the cases of Junction City, East Moline, and Webster City, the differences may be noted in tables 2 and 3. The variation with respect to Pueblo, Monmouth, and Colorado Springs has been reported in a previous publication (1). In Conway the house-to-house recheck had a negligible effect on the group incidence, the 59 cases shown in table 6 revealing an incidence of 88.1, while the 26 verified rechecked schedules showed an incidence of 88.4 per 100 children.

COMPARISON OF PRESENT STUDY WITH A PREVIOUS ONE

Keeping in mind the probabilities of a somewhat lower percentage incidence of affection in certain samples limited to 9-year-old children (see table 6), it seems desirable to compare the findings of this study with one previously reported (*1*). As the earlier work (Colorado Springs-Monmouth-Pueblo) was limited to the 9-year-age group, the comparison will be made only with the same age group in Webster City, East Moline, and Junction City. In the 213 observations listed, each child was born in the community, lived there all of his or her life, used the communal water supply continuously for both drinking and cooking; and the facts in each instance were verified by one of us (HTD) by an interview with the child's parent.

TABLE 7.—*Relation between the fluoride (F) concentration and clinical effect in 9-year-old children with verified histories in 6 selected cities*

City and State	Number examined	Mean annual fluoride (F) content of common water supply (p. p. m.)	Incidence per 100 children
Colorado Springs, Colo.	54	2.5	66.6
Monmouth, Ill.	[1] 29	1.7	48.3
Webster City, Iowa	[1] 20	1.6	25.0
East Moline, Ill.	[1] 35	[2] 1.5	17.1
Junction City, Kans.	[1] 30	.7	3.3
Pueblo, Colo.	49	.6	4.0

[1] The number examined in these 4 cities was less than our minimal requisite of 50 when the incidence is less than 75 percent, but represents all of the children of this specific age group present in the public schools on the day of the examination who had a verified history of constant residence and continuous use of the municipal water. For importance of size of samples, see table 8.

[2] See footnote, table 4.

SAMPLING LIMITS

In evaluating the degree of reliability attached to percentage incidences computed on groups not meeting the present minimal requirements as to size, it is well to bear in mind the probability of fluctuation in small samples. Extensive data distributed over an adequate number of surveys have not as yet been accumulated in amounts sufficient to warrant the development of sampling limits in relation to waters of different fluoride concentrations. The magnitude and composition of the sample naturally bears a direct relationship to the percentage of affection of the particular endemic area being studied.

Pending the collection of further data we follow this standard with respect to size and composition of the sample used in the computation of an "actual" or an "approximate" community mottled enamel index.[5] The group examined is limited to children who since birth have continuously used the common water supply for both drinking and cooking, breaks in continuity totaling less than 30 days in any one calendar year being excepted.

Actual mottled enamel index.—The sample of children upon whom the index is based must consist of 25 or more, 9 years of age or older. Whenever possible, the sample should consist of 9-, 10-, 11-, and 12-year-old children, represented in approximately equal numbers. In instances where the examination of the first 25 reveals an incidence of less than 75 percent, the size of the sample must be increased to 50 or more to compensate for fluctuations in sampling. All histories as given by the child with respect to both residence and water supplies must be rechecked and confirmed by an interview with the child's parent. This index is computed only when there have been no relevant changes in the physical set-up of the common water supply concomitant with the life period of the group examined.

Approximate mottled enamel index.—The minimal requisites with respect to numbers examined and age distribution as given for an "actual mottled enamel index" are followed, but individual histories are not rechecked by an interview with the child's parent. The approximate mottled enamel index is particularly useful in routine surveys.[6] Numerous surveys have shown that after careful cross-questioning of each individual child, the remaining error with respect

[5] This index is merely a numerical ratio (7) of measurement that points out the approximate percentage distribution of clinical severity observed in the group at the time of the examination.

[6] In surveys of small communities we have frequently computed what is known as a "tentative mottled enamel index" as the number of children with continuity of exposure is insufficient to compute an "actual" or "approximate" index. The sample in this instance consists of not less than 10 but not more than 24 children.

to either residence or water history is largely compensatory and the house-to-house recheck as required for the "actual mottled enamel index", results in little change in either the percentage of affection or the percentage distribution of severity of the group as a whole.

Instances of fluctuation in incidence in samples of different sizes and combinations in the case of four cities with mean annual fluoride (F) contents of 4.4, 3.9, 2.5, and 1.5 [7] parts per million, respectively, are shown in table 8.

TABLE 8.—*Examples of fluctuation in percentage incidence in samples of different sizes and combinations in (a) the same endemic area, and (b) endemic areas showing different fluoride concentrations*

Age group	Number of children examined	Designation of school	Classification of mottled enamel diagnosis							Incidence of mottled enamel per 100 children
			Normal	Questionable	Very mild	Mild	Moderate	Moderately severe	Severe	
Lubbock, Tex. Mean annual fluoride (F) content, 4.4 p. p. m.										
9-year-old children	20	School A	0	1	4	6	7	2	0	95
	18	School B	1	0	2	3	8	4	0	94
	19	School C	0	1	1	4	10	2	1	95
	13	Schools D [1]	0	0	1	5	6	1	0	100
	70	All schools	1	2	8	18	31	9	1	95.7
		Percentage incidence in different combinations								
		Schools AB (38) 95 ‖ Schools CD (32) 97								
		Schools AC (39) 95 ‖ Schools ABC (57) 95								
		Schools AD (33) 97 ‖ Schools ABD (51) 96								
		Schools BC (37) 95 ‖ Schools BCD (50) 96								
		Schools BD (31) 97 ‖ Schools CDA (52) 96								
Amarillo, Tex. Mean annual fluoride (F) content, 3.9 p. p. m.										
9-year-old children	19	School A	1	3	3	5	4	3	0	79
	17	School B	0	0	2	8	7	0	0	100
	25	School C	1	3	3	7	9	2	0	84
	16	School D	2	0	2	3	6	2	1	87
	77	Schools A, B, C, D	4	6	10	23	26	7	1	87
		Percentage incidence in different combinations								
		Schools AB (36) 89 ‖ Schools CD (41) 85								
		Schools AC (44) 82 ‖ Schools ABC (61) 87								
		Schools AD (35) 83 ‖ Schools ABD (52) 88								
		Schools BC (42) 90 ‖ Schools BCD (58) 90								
		Schools BD (33) 94 ‖ Schools CDA (60) 83								

[1] Schools "D" — a combination of scattering cases from 3 schools.

[7] See footnote to table 4.

TABLE 8.—*Examples of fluctuation in percentage incidence in samples of different sizes and combinations in (a) the same endemic area, and (b) endemic areas showing different fluoride concentrations*—Continued

Age group	Number of children examined	Designation of school	Classification of mottled enamel diagnosis							Incidence of mottled enamel per 100 children
			Normal	Questionable	Very mild	Mild	Moderate	Moderately severe	Severe	
Colorado Springs, Colo. Mean annual fluoride (F) content, 2.5 p. p. m.										
9-year-old children	13	School A	2	3	3	2	3	0	0	62
	23	School B	7	3	6	4	2	1	0	56
	15	School C	4	2	6	1	1	1	0	60
	15	School D	1	2	4	5	3	0	0	80
	13	School E	1	1	5	2	4	0	0	85
	79	Schools, A, B, C, D, E	15	11	24	14	13	2	0	67.1

Percentage incidence in different combinations

Schools AB (36)	58	Schools ABC (51)	59
Schools AC (28)	61	Schools ABD (51)	65
Schools AD (28)	71	Schools ABE (49)	65
Schools AE (23)	73	Schools BCD (53)	64
Schools BC (38)	58	Schools BCE (51)	65
Schools BD (38)	66	Schools CDE (43)	74
Schools BE (36)	67	Schools CDA (43)	67
Schools CD (30)	70	Schools DEA (41)	76
Schools CE (28)	71	Schools DEB (51)	71
Schools DE (28)	82	Schools EAC (41)	68

Age group	Number of children examined	Designation of school	Normal	Questionable	Very mild	Mild	Moderate	Moderately severe	Severe	Incidence of mottled enamel per 100 children
East Moline, Ill. Mean annual fluoride (F) content, 1.5 p. p. m.[1]										
9-, 10-, and 11-year-old children.	24	School A	14	5	3	2	0	0	0	21
	40	School B	22	8	9	1	0	0	0	25
	19	School C	11	1	6	1	0	0	0	37
	10	School D	5	2	1	1	1	0	0	30
	17	School E	9	6	1	1	0	0	0	12
	110	All schools	61	22	20	6	1	0	0	24.5

Percentage incidence in different combinations

Schools AB (64)	23	Schools ABC (83)	26
Schools AC (43)	28	Schools ABD (74)	24
Schools AD (34)	23	Schools ABE (81)	21
Schools AE (41)	17	Schools BCD (69)	29
Schools BC (59)	29	Schools BCE (76)	25
Schools BD (50)	26	Schools CDE (46)	26
Schools BE (57)	21	Schools CDA (53)	28
Schools CD (29)	34	Schools DEA (51)	20
Schools CE (36)	25	Schools DEB (67)	22
Schools DE (27)	19	Schools EAC (60)	23

[1] See footnote to table 4.

NOTE.—Number in parenthesis following each combination indicates the size of the sample.

APPLICABILITY OF THE SEVEN-GRADE CLASSIFICATION OF DIAGNOSIS

In 1934 there was published a classification of mottled enamel diagnosis (*8*). At that time the classification was based upon approximately 2,000 observations made in endemic areas of six different States. The primary purpose in developing this classification was to provide a standard of measurement for recording the degree of severity

as observed in communities whose water supplies contained various concentrations of fluorides. To date, its applicability has been tested by one of us (HTD) in more than 10,000 examinations in about 185 areas distributed among 16 States. A large majority of these were endemic areas; but in connection with these surveys the classification has, of course, been applied in the study of borderline and negative, or "control", areas.

Certain objections have been raised to the use of this classification on the grounds that seven grades tend to make the classification complex. Some have suggested a classification of "mild", "moderate", and "severe" in the interest of simplification. This proposal is evidently based on the erroneous assumption that the entire classification is to be used in a survey of any particular endemic area. Such is not the case.

In considering the simplified classification, "mild", "moderate", and "severe", we would naturally have to add a fourth grade, "normal" in order to obtain the figure upon which the percentage incidence might be computed, or to show that the recorded frequency of occurrence of mottled enamel plus the frequency of no mottled enamel equals the total number of observations. In other words, it may be taken for granted that the classification could not be reduced to less than four grades under any conditions.

Those who would simplify the classification would omit the "questionable", "very mild", and "moderately severe" grades. The quantitative aspects of a survey would probably be entirely lost, or judged erroneously, if the "questionable" cases were thrown into one grade or another of the proposed four-grade classification. Similarly, the omission of the "very mild" and "moderately severe" grades would probably seriously affect the calculation of the community mottled enamel index. This retrogression from quantitative methods would result in abstruse survey data of little value for purposes of comparison with other endemic areas of greater or lesser degree of severity.

An analysis of the data from 15 surveys, totaling 1,542 observations, indicates the flexibility of the seven-grade classification. In these 15 cities, where the percentage incidence ranges from 2.4 to 100, it is noted that more than 90 percent of all diagnoses fall into not more than four grades (arithmetical mean, 95.3; weighted average mean 92.0). A cursory analysis of table 9 makes apparent the flexible features of a seven-grade classification and its applicability to areas of dissimilar degrees of clinical severity.

TABLE 9.—*Illustration of (a) the tendency of mottled enamel diagnoses to fall into 4 grades (as indicated by figures in boldface type), and (b) the adaptability of the 7-grade classification to meet the survey needs in communities having waters of different fluoride concentrations*

City and State	Number of children examined	Mean annual fluoride (F) content in p. p. m.	Percentage incidence of affection	Percentage distribution of clinical severity							Highest percentage of diagnoses falling into not over 4 grades	Age group or school grade examined
				Pathognomonic signs								
				Absent		Present						
				Normal	Questionable	Very mild	Mild	Moderate	Moderately severe	Severe		
Pueblo, Colo	83	0.6	2.4	88.0	9.6	2.4					100.0	9-year old.
Junction City, Kans	115	.7	1 7	95.7	2.6	1.7					100.0	9-, 10-, 11-year old.
Mullins, S. C	47	.9	10.6	68.1	21.3	8.5	2.1				100.0	Do.
East Moline, Ill	110	[1] 1.5	24.5	55.5	20.0	18.2	5.4	0.9			99.1	Do.
Webster City, Iowa	72	1.6	26.4	65.3	8.3	22.2	4.2				100.0	Do.
Monmouth, Ill	38	1.7	42.1	36.8	21.0	36.8	5.3				100.0	9-year old.
Galesburg, Ill	57	1.8	35.1	45.6	19.3	26.3	5.3	3.5			96.5	Do.
Clovis, N. Mex	179	2.2	72.1	11.7	16.2	21.8	36.9	12.3	1.1		87.2	9-, 10-, 11-, 12-year old.
Colorado Springs, Colo	148	2.5	67.6	18.2	14.2	28.4	21.6	14.2	3.4		[2] 82.4	9-year old.
Plainview, Tex	97	2.9	87.6	4.1	8.3	34.0	26.8	23.7	3.1		92.8	9-, 10-, 11-, 12-year old.
Amarillo, Tex	289	3.9	90.3	3.1	6.6	15.2	28.0	33.9	11.1	2.1	88.2	Do.
Conway, S. C	59	4.0	83.2	5.1	6.7	20.4	32.2	23.7	11.9		88.2	9-, 10-, 11-year old.
Lubbock, Tex	189	4.4	97.8	1.1	1.1	12.2	21.7	46.0	15.3	2.6	95.2	9-, 10-, 11-, 12-year old.
Post, Tex	38	5.7	100 0				10.5	50.0	34.2	5.3	100.0	4th, 5th, 6th grades.
Ankeny, Iowa	21	[3] 8.0	100.0				9.5	47.6	33.3	9.5	100.0	Second to twelfth grades, inclusive.

[1] See footnote to table 4.
[2] The percentage distribution of severity in decreasing order is equal in the fourth and fifth tabular cell, 14 2.
[3] Based upon a single chemical determination; all others represent arithmetical mean annual fluoride (F) content.

CONCLUSION

In accordance with previously described means (7) of determining the mottled enamel index of a community, the application of this method to the percentage distribution of severity as listed in table 2 indicates that the approximate mottled enamel index of Clovis, N. Mex., is "slight", that of Webster City, Iowa, and East Moline, Ill., "border line", and that of Junction City, Kans., "negative." The application of these same ratios to the rechecked verified data in table 3 shows that the actual mottled enamel index of East Moline, Ill. is "border line" and that of Junction City, Kans., "negative." The percentage distribution of severity, however, in the case of Webster City, Iowa, shows an approach so close to the next higher index that the actual mottled enamel index of this city should be listed as "border line—slight."

Analysis of the data in this study confirms the previous statement (3) that "amounts not exceeding 1 part per million expressed in terms of fluorine (F) are of no public health significance."

SUMMARY

1. The "approximate" mottled enamel index of Clovis, N. Mex., is "slight"; that of Webster City, Iowa, and East Moline, Ill., "border line"; while that of Junction City, Kans., is "negative." The "actual" mottled enamel indexes of East Moline and of Junction City are the same as the approximate indexes; but the "actual" index of Webster City approaches so close to the next higher classification that it is listed as "border line—slight."

2. The mean annual fluoride (F) content based upon monthly examinations of the common water supply received between December 1935, and November 1936, was for Clovis, N. Mex., close to 2.2 parts per million; for Webster City, Iowa, 1.6 parts per million; for East Moline, Ill., 1.5 parts per million (subject to certain corrections which might bring it down to about 1.3 parts per million); and for Junction City, Kans., 0.7 parts per million.

3. Problems of sampling, particularly with respect to adequateness, are discussed and illustrated with examples from surveys of cities whose common water supplies show different fluoride concentrations.

4. The need, for quantitative purposes, of the "seven-grade" classification of mottled enamel diagnosis is shown.

5. Additional evidence is presented that amounts of fluoride (F) not exceeding 1 part per million are of no public health significance.

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RELATIONSHIP OF A RURAL HEALTH PROGRAM TO THE NEEDS IN THE AREA[1]

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From early colonial days a wholesomeness has been associated with rural and village life. In popular imagination, health, perhaps more than any other attribute, characterizes country folks as compared with their city brethren. While there has been some foundation for this impression in days gone by, still the belief persisted long after significant changes had taken place in urban environments, and after facilities had been perfected for carrying into effect the recently acquired knowledge regarding prevention and treatment of disease.

The first inquiries into rural health conditions of the Southern States revealed a prevalence of intestinal infections and intestinal parasites clearly beyond the limits that would be tolerated in cities. To correct this condition programs of sanitation were inaugurated which emphasized the building of sanitary privies. The impetus given to this movement was so great that it has dominated the program of many southern rural health departments to this very day.

Following the disclosures of these sanitary surveys, inquiries were made concerning physical status, especially of children. The findings were disconcerting, to say the least. Those of particular interest to public health workers of that period were poor nutrition and disease conditions in the structures of the mouth and nose. The public health nurse, who had been such a potent force under urban conditions, was installed in rural areas for the purpose of inducing corrective measures. In this new environment she was expected to accomplish results without the supporting clinic service to which she was accustomed in the city.

In the initial stages of rural health work, beyond which many areas have not yet passed, an administrative officer, usually a local practicing

[1] From Division of Public Health Methods, National Institute of Health, in cooperation with Division of Domestic Quarantine.

physician, was employed by the county, the townships, or the villages, and not infrequently by all three types of political units. Only a small part of the health officer's time was required to discharge his official duties. These seldom included more than the imposition of quarantine measures for the control of communicable diseases and the investigation of complaints which usually grew out of nuisances offensive to sight or smell. It was felt that a great forward step had been taken when the position of health officer was placed on a full-time basis and a lay inspector was employed to promote rural sanitation. Except for supervising the sanitation work and the nursing service, the scope of the health officer's duties was not expanded materially, but within his field a more intensive type of service was inaugurated. With the employment of a full-time health officer, the county by common acceptance is recognized as having an organized health department. Higher degrees of adequacy are attained as a rule by additions to the nursing staff.

Through the years in which county health departments have been in existence, very little effort has been made to appraise the program objectively. It has been assumed, and perhaps rightly so, that the advances in health, as expressed by declining morbidity and mortality rates, must have resulted in part at least from the protective and promotional measures that were put into effect. Only recently the United States Public Health Service inaugurated a series of investigations which should ultimately shed some light on questions concerning the effectiveness of different types of public health service that have been established in rural areas. The first step is to determine in a general way whether local programs follow some standard design, or whether they are shaped specifically to meet the basic health needs of the people.

The local health agency under consideration in the present study may be described as a small county health department consisting of a medical health officer, two public health nurses, and a sanitation officer. They are expected to serve a population of approximately 34,000 people. In the supporting social structure there are 18 physicians and 5 dentists, all of whom might be classed as general practitioners. The study area contains no hospitals or organized clinic facilities for the care of those who are ill. Social welfare service is limited in amount and character, consisting primarily of money grants or work relief for the needy. A few functions which affect health in an indirect way are sponsored by a county agent and by a home demonstration agent. Among the more important items in the promotional programs of these agents may be mentioned gardening, production of milk and eggs, menu planning, housekeeping, and recreation.

The area may be described as two similar rural counties which have pooled their resources to form a single health district. One county seat contains 2,144 inhabitants and the other 1,629. The remaining population is distributed in small villages or in the open country. Approximately one-half of the population are Negroes and the other native white. The great majority of both the white and colored races follow agriculture, and the remainder engage in pursuits that serve the farm population. Cotton, tobacco, and peanuts, in the order mentioned, constitute the principal crops.

The first unit of the present health organization, a sanitation officer, was installed in 1920. One public health nurse reported for duty in 1924, and the second followed in 1928. The position of health officer for one county was placed on a full-time basis in 1924. The present incumbent relinquished an extensive rural practice in 1928 to take over the direction of the newly organized bicounty health department. The total budget of the department is about $12,000. Approximately $2,000 is reserved for travel and incidental expenses, and the remainder is consumed by salaries of the regular staff.

The health department depends on two basic techniques—education and regulation—in the approach to its problem. Education is the chief reliance, but the expressed and implied powers of the health officer may be used in persuasive measures where acts or omissions of individuals endanger community health.

The aforementioned investigation by the United States Public Health Service into rural health programs was pursued in part through the records of the health department. The daily activities, for the term of the study, of the health officer, the nurses, and the sanitation officer were recorded on survey forms for later tabulation and analysis. Departmental records, however, are too bare, too concise, to do justice to the subject. They show only the fact and type of service, not the set of conditions out of which the need for such service grew and in which there may be remaining and unregarded needs. They do not show the problem as a whole, but only that part touched by the health department's program.

So the family survey was devised as a means of arriving at the complete picture. This, as its name implies, is a canvass of a sample of familes, the term "family" as here used including all persons living together in one household. The interviews with the 1,009 families, or households, making up the sample were intended to reveal the conditions under which each of these groups of individuals lived, and the health situation in each household for the study period. Under the first come the nature of the premises, the economic status of the family, and the age and sex composition of the household; under the second the illnesses afflicting the members over the 12-month period of the study, the medical care and all other attention bearing on the health

of the individuals. The informant was especially interrogated regarding the contact that the family had with the health department during the study year; contact, that is, between any individual in the household and any member of the health personnel at whatever place—it might be a talk out in the backyard between the household head and the sanitation officer, or the examination given a crippled child at the orthopedic clinic, or perhaps maternity advice given the mother by the public health nurse in the home.

The sample of families was so chosen that it would embody within its compass those stratifications of conditions of life that cut across the region under consideration. A carefully selected sample, it was thought, would constitute a miniature of this health jurisdiction and its health problems and programs.

Of the 1,009 premises occupied by this sample of families, 268 are located in the 2 county-seat towns, 112 in the villages and hamlets, and 629 in the open country. Those in the country are in part farms and in part simply isolated homes. A number of the rural workers are tenant farmers, who operate on an exceedingly small scale, or sharecroppers, who with their families live in a hand-to-mouth fashion.

The range of economic status prevailing in this portion of the country has been divided under the headings of comfortable, moderate, poor, and very poor. So far as was possible, the proportion of each of these classifications to the population as a whole was carried over into the sample of families selected for survey, as was also the proportion of colored persons within each classification. The sample subdivides as follows:

Comfortable: 88 families, about 10 percent of which are Negroes.
Moderate: 420 families, about 30 percent of which are Negroes.
Poor: 374 families, about 68 percent of which are Negroes.
Very poor: 127 families, about 82 percent of which are Negroes.

These classifications by economic status represent ways of living rather than actual income. Among those families said to be in comfortable circumstances, many are not possessed of any considerable means; they are simply better off than their neighbors. In this group are included a relatively small number that could be considered well-to-do. The families in the moderate status are deemed to have a certain margin of security, though not enough to enable them to carry any prolonged financial burden brought about by illness or other adversity.

About half of the families fall in the low income group and appear to live along or below the level of subsistence. They have their clothing, or at least some clothes, their shelter, and meals of a greater or lesser degree of nourishment. Many of these poor are distinctly underprivileged and undernourished. Negroes predominate in this group.

On the whole, the colored people live under less wholesome and less sanitary conditions than do the white. The average size of the white families is 5.0, and the mean number of rooms per family is 5.8. For the Negroes the average size of family is 6.1 and the mean number of rooms 4.2. The small 2- or 3-room cabin is a common dwelling along the streets and highways of this section, sometimes doing duty for one or two persons and sometimes filled to capacity. As might be expected, this overcrowding is most prevalent among the poor and adds to their other problems.

Around 40 percent of the white households and about 18 percent of the colored were recorded by the survey workers as exceptionally clean and tidy. A small percentage were unsightly and unsanitary, and the remainder were clean or fairly so.

THE SANITATION PROBLEM AND THE SANITATION PROGRAM

The investigators were instructed to ascertain on each premises what means served the family for the disposal of excreta, from what source the drinking water came, and to what extent the house was screened. They were to ask the family informant whether the sanitation officer made a visit to the premises during the year which the study covered.

Records of the health department, it might be well to point out here, show that the sanitation program was directed for the most part to the repair, the building, or the rebuilding of privies. The sanitation officer performed other duties, such as the investigation of nuisances or the inspection of public or private water supplies, but the privy program apparently took up most of his time.

In a population such as this, where the income level is very low, the criterion of sanitation must be a simple one. It should include a privy in such a location that seepage therefrom will not endanger the quality of the drinking water, and in such a condition that its contents are not exposed to flies. A well or spring protected from pollution and a house screened against flies and mosquitoes should also be included in sanitary standards for family premises. It is not the simple matter that one accustomed to modern conveniences might think to bring this degree of sanitation about. Tenants can be quite uninterested in refining property that belongs to another. Owners can, and often do, disclaim all responsibility for premises which they do not themselves occupy; and whether tenant or owner, many a person lives in contented unawareness of the relationship between disease and his mode of living. Then, too, a preventive measure does not exert the same appeal as does one of active defence. The sanitation officer cannot with certainty predict, "That well water is going bad some day unless you move the privy, and you will all be sick." The most he can safely say is, "You might be sick", and the remote

possibility of illness can be as impotent as the remote possibility of war in inducing some individuals to change a situation.

Added to these obstacles set up by the vagaries of human nature is the natural limitation to which one sanitation officer is subject in serving a population of 34,000 persons in a rural territory, the remoter sections of which are 35 to 45 miles from his headquarters.

The sanitation on most of the surveyed premises depends upon the disposition and means of each householder. Of the total in the sample, 112 are included in municipal sewerage systems. Another 33 householders have installed flush toilets with some method of private disposal. On 42 premises there is no device at all for the disposal of excreta, and these probably represent 42 of the most difficult situations with which the sanitation officer has to deal. Efforts to talk the responsible person, or the persons directly concerned, into making a change can be time-consuming, and often the officer will have little in the way of results to show for his pains. Health department records show that such premises receive more visits than those with some means for the disposal of excreta.

As might be expected, the economic gap between the white and colored races is here revealed; the municipal sewerage facilities and the private disposal methods being found mainly on the premises of white families. The lack of satisfactory arrangements is most frequent among the Negroes. In fairness, however, it must be stressed that these are generalities; some Negro householders have installed septic tanks, and some white families are apparently unconcerned about the whole matter of sanitation.

Privies are the most common device for the disposal of excreta met with among the sample of family premises. The suitability of these devices may be inferred from the data given in an analysis (*1*) of the activities of the sanitation officer for these two counties. It is said in that analysis that he found about 75 percent of the privies unsatisfactory on his first visit. This includes privies that never had been satisfactory, and those that may have been so once but had deteriorated under time, the weather, and use. Where the repairs were minor, according to this account of his work, he often made them himself; in fact, he repaired about 18 percent of the total number of insanitary privies inspected by him during the period of time under review in that paper. On another 12 percent of the premises on which stood insanitary privies, he managed to induce the occupants to make repairs. Behind this 12 percent there are a series of revisits by the sanitation officer—1 revisit to two-thirds of the premises, and as many as 6 to some of the others. His most frequent recommendation, it seems, was for a new privy. The next most frequent recommendation was for repairs to the riser, or seat box.

According to the collective memory of the family informants, the sanitation officer visited during the study year—

12 (about 29 percent) of the premises with no means for excreta disposal;
11 (about 33 percent) of the premises with septic tanks or other system of private disposal;
165 (about 42 percent) of the white family premises with privies; and
228 (about 51 percent) of the Negro family premises with privies.

This summary takes no account of revisits, nor of recommendations made and improvements brought about. It simply establishes the number of premises that were recollected as visited by the sanitation officer during this year which the study covered. Premises connected with municipal sewerage systems, of course, would not normally be in line for a visit from him.

As to the sources of water, aside from city water, there are 177 springs and 685 wells among these premises. The springs may be considered questionable sources of drinking water until proved otherwise. The survey workers recorded that 83 of the 177 springs were on a slope below the privy—a perfect setting for a stray case of intestinal infection to spread and make a showing.

Information on the details of the 685 wells is not complete. The investigators reported 34 wells as being on a slope below the privy. A certain percentage they reported as having no earth protection against pollution, or as having loose casings, but the conditions were not clearly described on the whole. Such information as was recorded would indicate that many of these wells are in need of improvement.

Complete screening of the houses, according to the data, is not at all extensive. Less than one-fifth of the houses were recorded as fly proof. About one-fourth had no screens at all. Some screening was found on the remaining dwellings, although not sufficient to afford full protection against flies and mosquitoes.

It cannot be said that the water supply and the screening on these premises where visits by the sanitation officer were reported were actually reached by the sanitation program. They came within the frame of this program, but were not touched to any great extent thereby.

In summary of the reported activities of the sanitation officer within the sample of families, an analysis of the inspected premises indicates that he distributes his activities quite evenly between town and open country homes, between poor families and those that are better off, and between the white and colored races. In the towns and villages a somewhat higher percentage of premises visited was recorded among the Negro families. This perhaps reflects the concentration of colored families in the unsewered sections of town, and the attempt of the sanitation officer to spend the greatest amount of effort where the need is greatest.

The report for the sample of families shows the sanitation officer as reaching within the study year about 46 percent of those premises not coming within a municipal sewerage system. The analysis of his activities (*1*) to which reference has previously been made indicates that, by dint of making repairs himself, and of revisiting those premises where he has left recommendations, he manages to transfer about 30 percent of the privies which he has found upon inspection to be insanitary to the approvable class.

THE ILLNESS PROBLEM

A total of 5,630 individuals make up the 1,009 households selected for study. They include persons of all ages—infants, children, mature persons, and old men and women. About 55 percent are Negroes.

It is proposed to show herein the extent to which illness reached into the ranks of these individuals over a period of 12 months, and the amount of medical care that was reported. It is believed that many of those homes in which there were ill persons who had no medical care represent situations in which a society holding itself responsible for the health and welfare of the underprivileged would recognize a challenge and a reproach. The emphasis of the discussion will be upon those in poor or very poor circumstances, since unfortunate illness situations flourish the more profusely among those who are short on material possessions.

Illness being a variable term, it was necessary to establish a boundary that would divide those indispositions which were to be considered illnesses from those that were not. All communicable or reportable conditions were put in the illness class. Other conditions were judged by reason of the limitations they placed upon the sick person, or by the factor of medical or nursing attendance. If a malady kept a person in bed for 1 day or more, if it kept him from school or work 3 days or more, if it engaged the attention of a physician, the health officer, public health nurse, or some other attendant, it was considered an illness. An immunization was regarded as an illness only if it brought in its train any of the conditions mentioned. Two illness states occurring simultaneously or consecutively with no interval between were considered as a single illness.

This classification of illness is essentially the same as that followed in the Hagerstown studies (*2*) and in the survey conducted by the Committee on the Costs of Medical Care (*3*).

The total illness rate set by the data under review is 640 per 1,000 persons, rather lower than the rates of 1,080 and 850, respectively, established by the other two surveys. The difference is due in part to the unusual prevalence of influenza and other respiratory infections during the course of the two studies referred to, and in part to the larger number of slight colds and other minor conditions that

would be collected by the several spaced calls made by their investigators, as against the one-call method followed in the present studies.

Eliminate the respiratory group of illnesses and the rate becomes 424 for the Hagerstown studies, 502 for the survey conducted by the Committee on the Costs of Medical Care, and 498 for the data herein discussed. It will be seen, therefore, that these data are comparable to those evolved through studies of a like nature.

They reveal, first of all, that about 54 percent of the 5,630 individuals were not ill during the 12-month study period. Another 34 percent were ill but once, and around 11 percent more than once. The white people and the Negroes are about equally represented in each of these divisions. The difference between the total illness rate of 654 for the white and that of 628 for the colored individuals, as established by these data, is probably the result of chance variation and of poorer reporting among the colored.

Table 1 shows the distribution of illness by broad diagnostic groups and according to race. The respiratory group of diseases is seen in its accustomed highest position both as a bed and a nonbed illness. The disorders of the digestive system rank second highest. About half of the digestive disorders become bed illnesses. The third in order of importance by extent is the group of epidemic, endemic, and infectious diseases. Of these about 55 percent become bed illnesses. That group of indispositions attendant upon the puerperal state shows, as might be expected, the highest proportion of bed illness to total illness.

TABLE 1.—*Distribution of total illness and bed illness by broad diagnostic groups and according to color*

Diagnostic group	White			Colored		
	Total cases	Bed cases	Percent bed cases	Total cases	Bed cases	Percent bed cases
All causes	1,603	770	48.0	1,746	823	47.1
Respiratory diseases	392	244	62.2	352	239	67.9
Epidemic, endemic, and infectious diseases	181	108	59.7	173	87	50.3
Other general diseases	89	27	30.3	118	34	28.8
Diseases of nervous system	66	31	47.0	35	17	48.6
Diseases of eyes and ears	36	8	22.2	17	3	17.6
Diseases of circulatory system	63	22	34.9	68	31	45.6
Diseases of teeth and gums	42	7	16.7	49	21	42.9
Diseases of digestive system	233	104	44.6	193	101	52.3
Diseases of kidneys and urinary system	61	22	36.1	50	18	36.0
Nonvenereal diseases of genital organs and annexa	68	37	54.4	72	38	52.8
Puerperal state	80	73	91.2	114	105	92.1
Diseases of skin and cellular tissue	64	9	14.1	191	12	6.3
Accidents and other external causes	85	37	43.5	68	32	47.1
Diseases of bones, congenital malformations, other and ill-defined diseases	143	41	28.7	246	85	34.6
Total years of life		2,451			2,781	

The number of cases of illness in the different diagnostic groups is not large enough to permit minute analysis of seeming distinctions between the two races, but the data do indicate certain variations.

Nervous and digestive disorders appear to be more prevalent among the white people. Those vague ills that can be listed only as ill-defined, however, are reported much more frequently among the colored. Diseases of the skin and cellular tissue were reported about three times as much by the colored as by the white—a total of 191 such illnesses being recorded for the Negroes. Teeth and gum conditions, while reported to about the same extent by both races, were said to cause bed illnesses in about 43 percent of the cases among the colored, whereas about 17 percent were so reported among the white. This fact might point to extreme neglect of the teeth among the colored, due undoubtedly to economic circumstances; it probably means also that when trouble does develop the proper treatment is not given and actual illness is frequently the result of this neglect.

In table 2 it can be seen that the colored families reported less medical attention than did the white. In some groups of diseases, notably conditions resulting from the puerperal state, they reported considerably less. Altogether, about 70 percent of the bed illnesses among the white individuals were reported as having had medical attendance—this might mean one visit from or to a physician, or it might mean several, but at least their condition was observed and diagnosed.

TABLE 2.—*Distribution of bed illnesses by color and percentage attended by a physician* [1]

Diagnostic group	White		Colored		Percent of total bed cases attended
	Bed cases	Percent attended	Bed cases	Percent attended	
All causes	770	69.7	823	51.9	60.5
Respiratory diseases	244	63.1	239	46.9	55.1
Epidemic, endemic, and infectious diseases	108	50.0	87	29.9	41.0
Other general diseases	27	92.6	34	64.7	77.0
Diseases of nervous system	31	80.6	17	47.1	68.8
Diseases of eyes and ears	8	75.0	3	33.3	63.6
Diseases of circulatory system	22	95.5	31	80.6	86.8
Diseases of teeth and gums	7	42.9	21	19.0	25.0
Diseases of digestive system	104	81.7	101	58.4	70.2
Diseases of kidneys and urinary system	22	86.4	18	94.4	90.0
Nonvenereal diseases of genital organs and annexa	37	73.0	38	60.5	66.7
Puerperal state	73	74.0	105	41.9	55.1
Diseases of skin and cellular tissue	9	77.8	12	58.3	66.7
Accidents and other external causes	37	91.9	32	84.4	88.4
Diseases of bones, congenital malformations, other and ill-defined diseases	41	56.1	85	61.2	59.5

[1] Includes dentist. Does not include health officer.

Among the Negroes about 52 percent of the bed illnesses were reported as having been seen by a physician. The gap between the percentage of medical care received by the two races is, it might reasonably be assumed from other circumstances, evidence not of less need but of fewer privileges. It is testimony of the smaller margin of security possessed by the colored, and of the generally poorer circumstances under which they live.

These comparisons of amount of medical attention to amount of illness do not rest upon the premise that all indispositions classified as illness require medical treatment. However proper that may be theoretically, it does not fit the actualities of life in this region; and to talk within those actualities, one must make allowance for the common presumption that the person abed because of a cold, or perhaps the recurrence of some chronic condition, may be doing all that is reasonably necessary by staying in bed.

Still, the number of days in bed induced by the illnesses among these families points to a certain seriousness. About 28 percent of those illnesses which sent the patient to bed sent him there for 1 or 2 days, and another 42 percent occasioned a stay of from 3 to 8 days in bed. These percentages do not vary greatly between the races. Among the white families about 12 percent and among the colored about 15 percent of the illnesses caused 18 days or more in bed. This general effect of seriousness is further deepened by the extension of these disabling illnesses through all ranks. They put the poor and the very poor to bed for stretches of time, as well as those better able financially to give up their activities and responsibilities.

It will be observed from table 2 that diseases of the kidneys and those of the circulatory system were reported as receiving a high measure of medical care. This might be expected, since the definite naming of the diseases in these groups—diseases involving symptoms not usually known to the lay mind—implies diagnosis by a physician. Quite likely there are other cases of such illnesses, reported perhaps under some vague name, which have not been seen by a physician and are therefore not known to the persons sick with them.

It is the negative, however, rather than the positive side of the picture that is most to the point in a consideration of the illness problems of a people. How many of the sick do not have medical attention? And why do they go without it? Is there any provision for treatment of those who are financially unable to provide it for themselves? According to the Committee on the Costs of Medical Care (*4*), there are many families even in the steady income class that are unable to meet the physician's and hospital bills brought about by serious illness. In a group of families such as make up the sample under discussion, one would expect to find a fairly high percentage of illness for which no medical attention was had. The extreme poverty alone would guarantee that. The rural location of so many of the premises also influences the degree to which physicians are consulted.

At all events, among this sample of families some 40 percent of the bed illnesses occurring during the study year were reported as unattended by a physician. It may be taken for granted that many of these illnesses which had no medical treatment represent an inability to meet the needs of the sick, if from no other reasoning than

that so many of them were found in the ranks of the poor. In point of fact, 114 cases of illness, according to the informants, did not have medical treatment for the reason that the families were too poor to afford it. Other reasons given for having no physician involved objection to medical treatment or indifference to the necessities of the case. In all likelihood, these reasons of indifference or animosity or lack of money operated in more cases than were reported.

The epidemic, endemic, and infectious diseases show the largest percentage of bed illnesses unattended by a physician—about 59 percent. This is in line with the practice followed in many a home. If a child catches measles or mumps, or any one of those diseases commonly accepted by parents as part of the routine of childhood, but not considered dangerous, the mother may see to it that he stays in bed and is kept warm and comfortable. Whether she calls a physician depends to some extent on the family income and to some on the course of the disease. The necessity for medical care is more generally recognized when the disease appears to be scarlet fever or diphtheria. All the cases of these two diseases reported by the survey families were also reported as having been seen by a physician, though this might mean little more than that the only cases recognized as scarlet fever and diphtheria were those that were seen by a physician and diagnosed. There might have been others, unseen and undiagnosed, perhaps suspected and perhaps not. One mother reported that her child had been ill in bed from a sore throat, that it "looked like it might be diphtheria", but they did not call a physician; they were too poor.

The judgment of the parent as to the nature of the disease, and the condition of the patient might be offered as the prime factor in determining the demand for medical attention in this group of diseases. Examination of the data reveals that economic circumstances, as might be expected, apparently help to decide whether medical care should be had. Among those families considered in moderate or comfortable circumstances, about 50 percent of these bed illnesses were seen by a physician; among the poor and very poor, about 30 percent. Those who lived in isolated homes reported a smaller percentage of medical care than those in towns and villages—a difference resulting in part from the difficulty of getting the patient to a physician, or perhaps the absence of a telephone, or it might be the inability to meet the increased cost of a home visit. White families reported about 20 percent more medical care than did the colored.

About 16 percent of the bed illnesses occurring through the epidemic, endemic, and infectious diseases were said to have come to the attention of the health department—most of this percentage being made up of the scarlet fever and diphtheria cases. According to the

laws of this State, physicians must report communicable diseases to the health department, and thus it happens that the more serious diseases come to the notice of the health department, while the minor communicable illnesses may run their course without any medical attention. Aside from scarlet fever and diphtheria, only about 8 percent of the illnesses included in the general category of epidemic, endemic, and infectious diseases were reported as having come to the attention of the health department.

The respiratory infections offer another large group of bed illness unattended by a physician. This group includes grippe, bronchitis, head colds, sore throat—all those respiratory conditions in which the patient is likely to judge the severity of his own case and decide whether or not he needs the ministrations of a physician. The more serious types of such conditions, the pneumonias and tuberculosis, were all reported as receiving medical attention; but here again such a report may mean only that the reported number of such diseases were disclosed through diagnosis. It takes no account of those which may exist but have not been diagnosed. Among the more loosely termed conditions in this group there may lurk the beginnings of serious illnesses all unsuspected by the persons entertaining them; or perhaps they are suspected, but ignored.

About 7½ percent of the bed illnesses in the respiratory group were reported as having been in contact with the health department. Most of the patients making up this 7½ percent were incapacitated through tonsil and adenoid conditions.

The tuberculosis cases reported among these surveyed families are too few in number to yield a comprehensive view of the health department program for the control of this disease. Five of the 10 cases recorded among the Negroes were said to have been in contact with the health department. The one case recorded among the white people had been seen at the health department clinic. When the poverty so prevalent in this region is taken into consideration, the overcrowded conditions under which many of the families live, and the generally high incidence of tuberculosis wherever there is a large Negro population, one may reasonably suspect other cases of tuberculosis than were reported. More precisely, according to an analysis of the activities of this health department in controlling this disease "* * * one would be conservative in stating that there are in the two counties not less than 150 active cases of tuberculosis which should have been known to the health authorities" *(5)*. Inasmuch as the 5,630 individuals making up the sample represent about a 16 percent cross section of the population of the two counties, they probably harbor, according to the above opinion, about 24 active cases of tuberculosis.

The puerperal state shows about 45 percent of bed illnesses that were not seen by a physician. Here midwives took care of the cases.

Midwives were reported for about 66 percent of the conditions resulting from the puerperal state. The overlapping between medical care and care by a midwife may be attributed to those cases that proved too difficult for the midwife to handle, or perhaps to certain cases in which a physician was called only for the delivery.

The data reveal that midwives served both white individuals and Negroes, those with some means and those who were poor. The midwife attended the poor and very poor to about twice the extent that she did those in better circumstances. Colored families reported a midwife in about 80 percent of cases, and the white in about 45 percent. In the open country she attended about 72 percent of the cases and in the towns and villages about half.

Less than a fifth of the total puerperal conditions for the year were reported as having come to the attention of the public health nurse or the health officer. Where contact with the health department was reported, it may include ante-partum or post-partum care or both, advice to the mother on diet and hygiene for herself and the infant, on preparation of the layette, and other such considerations. Sometimes the nurse arranged for material relief to be given in maternity cases.

An analysis of the nursing service (*6*) shows that knowledge of maternity cases came to the nurses through the following sources: Midwives, the patients or their relatives, neighbors, chance (where the nurse discovers the case while visiting some other member of the family), and through private physicians. Other cases were reported by the poormaster, school teachers, practical nurses, and others.

Diseases of the eyes, the ears, the skin, and the teeth show about 53 percent of bed illnesses not attended by a physician. The number of bed illnesses within these groups, however, is too small to admit of analysis. It so happens that the few such illnesses from eye or ear troubles reported among those families with some means were all attended by a physician, while those other few reported among the poor all went unattended.

The unattended bed illnesses from diseases of the teeth and gums were recorded principally among the colored, particularly the colored families living away from the towns and villages. Almost invariably they were poor. The data, meager though they are on bed illnesses resulting from teeth conditions, do indicate definitely that for the most part they are illnesses of neglect.

No contact with the health department was reported for any bed illnesses caused by diseases of the eyes, the ears, the skin, and the teeth.

The remaining broad categories of diseases show areas of unattended bed illnesses varying from 10 to 15 percent for diseases of the kidneys, of the circulatory system, and for accidents; over 20 percent for rheumatism and certain general diseases; over 30 percent for diges-

tive and nervous disorders, diseases of the skin, and nonvenereal diseases of the genitals; and over 40 percent for the group of ill-defined diseases. Included in the latter group are a few cases of diseases of the bones and congenital malformations.

The unattended illnesses within these several groups may be divided for explanatory purposes as follows:

1. The vaguer ills of mankind. These are the nervousness, the upset stomach, the indefinite malaise or the itinerant pain, that may be loosely diagnosed without benefit of medical advice.
2. Ailments which are in reality the beginnings of serious conditions which go undiagnosed and undetected because they are not brought to the attention of a physician.
3. Chronic illnesses which have been diagnosed but are not seen by a physician in their subsequent attacks.

Where specific diseases are named, medical attention is usually reported also. Thus, the instances of cerebral hemorrhage, diseases of the heart, ulcers of the stomach, appendicitis, and so on are for the most part reported as having had medical treatment. The reports would indicate, however, that certain of these diseases may be diagnosed but thereafter neglected, even though they attack the patient severely and cause him to remain in bed. As usual, it is particularly among the colored, the poor, and those who live in inaccessible places that such attacks must be endured without the alleviations that medical treatment might bring. The rheumatic diseases furnish a case in point. The 16 bed illnesses occasioned by rheumatism among the white families were all reported as receiving medical attention, but only 15 of the 25 such illnesses among the colored were reported as attended. Those not having a physician were found to be chiefly among the colored poor living in isolated homes.

A scattering of these diseases was reported as having had contact with the health department. They include rheumatism, epilepsy, biliousness, appendicitis, here a case among the rural colored, there one among the village white, and so on. They are too few in number to be susceptible of analysis. The contact is likely to have been of a casual type, since actual care of such patients was not encompassed by the programs.

In support and illustration of the foregoing assumptions of human distress and need, one of the colored families of the 1,009 contributing data to this survey might be presented.

There are 8 persons in this family, and they live in a small and old country cabin of 3 rooms. The father raises corn and tobacco on a share-the-crop basis and, as might be surmised, the whole family lives considerably below the level of comfort. They keep some poultry, one hog, but no cows, and, according to the informant, have

no milk in their diet at all, though 6 members of the household are growing children.

All of the family, except an infant, were reported as suffering and having suffered for a year from an eruption which begins with tiny pustules that burst and form a scab. The mother, who gave the interview, said that the oldest child had been seen by a physician for this condition, but the others had not, as they could not afford it. She said that they used sulphur-and-lard ointment.

The mother said that she herself had suffered from headaches and constipation for several years, and from an almost constant pain in her right side, which she feared signified appendicitis. She said that she had had no medical diagnosis and for lack of money could not go to a physician.

A boy of 13 was in bed for 8 weeks during the study year, unable to use his legs. The mother said that he does not have full and unhampered use of his legs at any time, and was told by a physician some 10 years before that he would always have trouble in this respect. He does not have medical treatment—again, no money.

During the study year, the mother said, a child of 7 was ill in bed for 3 days with a tonsil condition, and one of 5 for 3 days with sore throat and fever. In neither case was any outside medical or nursing help received.

Barring a miracle, there would be no chance of this family's lifting itself out of this slough of sickness and general misery without outside and gratuitous help.

A white rural family reported much the same distressful circumstances. The mother said that she was pregnant, had been in bed for 10 days from a combination of sick headache, kidney trouble, and grippe, but did not have a physician because they had no money and hated to ask for credit. She added that she did not know what she would do when the time for confinement came, that she knew of no midwife in the neighborhood in whom she had confidence, that they had no telephone, and the nearest doctor lived some miles away.

There are 8 persons in this family. The school authorities reported to the parents that two of the children were underweight, and that their teeth and tonsils needed attention. In the midst of such pressing poverty, however, and the extremity in which the mother finds herself, it is ludicrous to exhort these parents to have their children's teeth filled and their tonsils removed, and to provide them with more nourishing food so that they may gain weight.

Neither of these families reported contact with the health department, except for the inspection of the premises of the white family by the sanitation officer. The two mothers, white and black, apparently had no expectation of help in the illnesses of their children

or of themselves, nor any idea of where such help might be found, or how it was possible to secure it.

The tenor of all the foregoing indicates the need for medical care through a fairly widespread section of the population. It shows that poverty, indifference or ignorance, and inaccessibility to medical facilities—sometimes all of them together—operate to let the sick go on being ill until they get well, or go on to more serious illnesses, or perhaps to a state of chronic invalidism. Women approach delivery without knowing how they are going to be taken care of. Children with conditions symptomatic at least of the more dangerous infectious diseases go undiagnosed and untreated except by home remedies.

Such circumstances were accepted with equanimity and resignation years ago, but are out of place in a society that professes to believe that the benefits of science belong to mankind regardless of his worldly state.

THE HEALTH PROGRAM

The foregoing commentary on the insufficiency of the public health program in meeting situations that call for medical treatment is by no means offered as an evaluation of the activities of the health department. These activities cannot be tested by an objective which they are not set up to reach. The personnel of the health department are engaged in carrying on a number of programs for the furtherance of health and the prevention of illness. As mentioned in the beginning of this discussion, this work is largely educational and regulatory in nature. That some agency does not provide medical care in any appreciable degree for the low-income group may be regrettable, since a survey through a fraction of the population discloses an acute need for such service; but this fact does not detract from the essential worth of the programs that are being carried out by the health department.

In point of fact, the department rendered during the course of the study year a considerable series of services to the families included in this survey. The sanitation officer, it will be remembered, reached about 46 percent of those premises not connected with the municipal sewerage systems. Sixty-two of the family informants (about 6 percent) reported that one or more members of the household had visited the cooperative clinic during the study year. By cooperative clinic is meant—

> The several tuberculosis clinics held during the year by a clinician from the State health department;
>
> The orthopedic clinic, sponsored by a local club, held monthly in each county; and
>
> The tonsillectomy clinic held at intervals.

Contacts reported with the health officer or the public health nurse represent for the most part personal services to individuals. Of the total 5,630 individuals, the following received such personal services:

1,116 received physical examinations or inspections;

571 received immunizations;

208 received services in the home or at the office of the health department.

The first item refers mainly to school inspections of pupils for physical defects or for symptoms of communicable diseases. They are made by the nurses usually, though in one of the larger schools the health officer and the nurse acted jointly. The 1,116 inspections reported means that about 75 percent of the individuals of school age were reached by this program during the course of the study year.

The prevention of diphtheria constitutes the major part of the immunization work. The health officer devotes much of his time to the Schick testing carried on in the schools, and the 571 immunizations reported are mainly such school services. However, smallpox, typhoid, and diphtheria immunizations are also given at the offices of the health department on Saturday morning, and these contribute to this total.

Other measures for the control of communicable disease are not fully brought out by the family data, but they may appropriately be alluded to here. The health officer is responsible for carrying out quarantine regulations. Placarding of premises is required for poliomyelitis, diphtheria, meningococcus meningitis, scarlet fever, and smallpox. It is the stated policy of the health officer to visit all cases of typhoid fever, diphtheria, scarlet fever, measles, meningitis, and poliomyelitis which come to his attention, according to an analysis of the communicable disease program previously published (7). It is stated in that paper that most of the cases visited by the health officer or public health nurse were patients attended by a physician. The family calls a physician who reports the disease to the health officer, and he in turn comes to visit the patient and placard the premises. Thus, those families that do not engage a physician are likely to be left out of the picture—not always, but undoubtedly to a great extent.

The 208 individuals listed as receiving home or office services are, for the most part, persons seen by the nurse in the home, or possibly by the health officer. A few were seen at the office of the health department. Some of them were bed patients, and the services to them have already been included in the discussion on illness and medical care. They were, to revert briefly, mainly in the group of epidemic, endemic, and infectious diseases, the respiratory infections, and the puerperal conditions. The other individuals making up the

208 were either ill without being sick in bed, or simply in line for a health supervisory or some other type of health department service.

It might be appropriate here to summarize those programs carried out, in part at least, through the home visits of nurses. The maternity and infancy program, according to an analysis (*8*) of the nurses' activities, accounts for about 40 percent of their first visits to homes. The tuberculosis program accounts for another 16 percent of first visits, and the supervision of those with chronic disease for about 20 percent. Control of communicable disease and general health supervision account for smaller percentages.

The program for maternity and infant supervision, as heretofore mentioned, consists of ante-partum and post-partum advice, preparations for delivery, for the layette, and the like.

The tuberculosis control measures are not well delineated by the data given by this sample of individuals, owing, perhaps, to the small numbers involved and the normal chance of their being missed. An analysis of the whole program has already been published (*5*). It is emphasized therein that the purpose of this tuberculosis program is to discover the individuals who are possibly or manifestly tuberculous and refer them to their family physicians, once the diagnosis has been established. Certain conditions are mentioned as working against an effective program—the poor and insanitary circumstances under which many of the families live; the insufficient bed capacity of the State sanatoria to which the local department must look for hospitalization of the tuberculous; and the charge made by these sanatoria for each patient.

Advice on diet and hygiene are the staples in the nurse's services where she encounters chronic illnesses, communicable diseases, and other conditions that call for health supervision.

The nurses are handicapped in meeting many of the situations because of the insufficiency of the programs, meritorious though the programs may be within their limited range. If the nurse calls upon the mother of a puny infant and through friendly advice induces her to change the child's diet, she is applying a program that fits the case. If the father in that home, however, is ill of diabetes and has no money for medical treatment, the nurse may advise him regarding diet and hygiene, but with no program of medical care she cannot do much to help the man. The health supervisory program here uncovers a situation which it cannot handle. The many such circumstances indicated by the data point the way for the enrichment of health programs.

It should be emphasized that all these data are based on reports of family informants. These informants were obliged to look backward over the events of the study year in order to answer the queries of the survey workers. Without a doubt the passing of upwards of 365 days had buried the memory of many of the health department

services. Then, too, the school children do not always report at home that the nurse or the health officer inspected them at school. The data, however, do reflect the general tenor of the health department programs, and it is believed that they indicate with a fair degree of accuracy the relationship of the health department to a representative fraction of the population within its field of endeavor.

SUMMARY

The foregoing study of the relationship of a rural health program to needs in the area is based upon interviews with a sample of families. This sample was taken from two similar rural southern counties which have combined to form a single health district. The families making up the sample were so chosen that they may be considered a representative fraction of the population. Relatively few of the people in these two counties have any measure of security, and about half of the families selected for study appear to live along or below the subsistence level. The data brought to light a profusion of those social ills which are followers of poverty, such as unsanitary premises, overcrowded living quarters, undernourishment, and illness without proper care.

As a measure of attack against some of the unfortunate conditions inherent in this section of life, the health department carries out a sanitation program concentrated on improving the means for excreta disposal. This program is directed toward that majority of premises not connected with any public sewerage system. Among the sample of families, according to the answers of the informants, this program reached during the study year about 46 percent of those premises that have privies or some other private means for the disposal of excreta, or no means at all.

The other part of the health department program is concerned with personal health. It emphasizes advice in matters of healthful living, advice directed particularly to mothers and children. Diagnostic aid is offered only in reference to tuberculosis and certain physical conditions among children.

In the area of neglected and partially attended illness occur most of the health problems for which the community makes little or no provision of an organized sort. Briefly, the situation is this: Much sickness and distress take their way among this fraction of the population and little is done to check them, for the reason that the patients are too poor to command medical treatment for themselves and society does not provide it for them. This gap in the provision for general welfare aggravates many ills and allows remediable physical defects to continue on to eventual disability.

It would appear from the study that health department programs are developed on the assumption that the people require most of all to be told what is necessary for health. The programs are not designed to cope with those barriers that may so effectually prevent a people from obtaining those things which they need.

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DEATHS DURING WEEK ENDED AUGUST 21, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug 21, 1937	Corresponding week, 1936
Data from 86 large cities in the United States:		
Total deaths	7,421	7,308
Average for 3 prior years	7,109	
Total deaths, first 33 weeks of year	294,877	295,589
Deaths under 1 year of age	538	470
Average for 3 prior years	518	
Deaths under 1 year of age, first 33 weeks of year	18,853	18,565
Data from industrial insurance companies		
Policies in force	69,683,606	68,265,792
Number of death claims	10,988	11,329
Death claims per 1,000 policies in force, annual rate	8.2	8.7
Death claims per 1,000 policies, first 33 weeks of year, annual rate	10.2	10.3

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 28, 1937, and Aug. 29, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 28, 1937	Week ended Aug. 29, 1936	Week ended Aug. 28, 1937	Week ended Aug. 29, 1936	Week ended Aug. 28, 1937	Week ended Aug. 29, 1936	Week ended Aug. 28, 1937	Week ended Aug. 29, 1936
New England States:								
Maine		1		1	7	21	0	0
New Hampshire					4		0	0
Vermont		1					0	0
Massachusetts		3			10	27	8	1
Rhode Island					5	1	0	0
Connecticut	1	1		1	8	3	1	1
Middle Atlantic States:								
New York	11	12	[1] 2	[1] 2	84	75	8	9
New Jersey	6	6	6	6	37	26	2	2
Pennsylvania	22	17			129	47	2	4
East North Central States:								
Ohio	14	17	4	8	93	13	3	1
Indiana	7	5	4	4	5	3	0	2
Illinois	15	25	5	2	51	11	4	2
Michigan	5	3			24	14	2	8
Wisconsin			28	12	21	16	1	1
West North Central States:								
Minnesota	1	2		8	2	4	1	0
Iowa [2]		5	2	1	3		1	1
Missouri	6	10	7	9	18		1	2
North Dakota	2	4		1		1	0	0
South Dakota					1	1	1	1
Nebraska		5			8	3	0	0
Kansas	2	5	1		6	2	0	0
South Atlantic States:								
Delaware [3]							0	0
Maryland [2,4]	3	3	2		11	6	0	3
District of Columbia	4				3	4	5	1
Virginia [3]	21	22			16	16	4	2
West Virginia	10	11	15	9	4	2	2	1
North Carolina [2,3]	34	36		5	24	6	1	2
South Carolina [3]	11	4	80	53	5	6	1	1
Georgia [3]	20	12					0	1
Florida [3]	6	1	2	1	6	1	0	3
East South Central States:								
Kentucky	15	11	5	12	37	15	1	3
Tennessee	14	17	15	7	14		1	2
Alabama [3]	14	26	4	1	5	4	9	2
Mississippi [3,4]	11	13					1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 28, 1937, and Aug. 29, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Aug. 28, 1937	Week ended Aug. 29, 1936	Week ended Aug. 28, 1937	Week ended Aug. 29, 1936	Week ended Aug 28, 1937	Week ended Aug 29, 1936	Week ended Aug. 28, 1937	Week ended Aug. 29, 1936
West South Central States:								
Arkansas	15	4	5	3	4		0	0
Louisiana [3]	10	9	5	23	1		1	2
Oklahoma [4]	4	6	27	8	5	3	0	0
Texas [3]	15	28	37	8	8	18	1	0
Mountain States:								
Montana [1]	2	1			3		0	1
Idaho	3					1	0	0
Wyoming					1		0	0
Colorado	1	3			16		2	0
New Mexico	5	5			21	1	1	0
Arizona	2	2	11	17		16	0	2
Utah [4]		1			15	3	0	0
Pacific States:								
Washington	2				35	4	0	0
Oregon	4	1	8	4	7	4	0	2
California	21	24	11	14	24	43	3	1
Total	339	362	286	215	776	421	63	59
First 34 weeks of year	14,082	15,102	274,785	140,307	241,920	267,760	4,250	5,938

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 28, 1937	Week ended Aug. 29, 1936	Week ended Aug. 28, 1937	Week ended Aug. 29, 1936	Week ended Aug 28, 1937	Week ended Aug 29, 1936	Week ended Aug 28, 1937	Week ended Aug 29, 1936
New England States:								
Maine	8	1	2	7	0	0	9	8
New Hampshire	5	0	1		0	0	3	0
Vermont	5	0	1	4	0	0	0	0
Massachusetts	51	3	20	26	0	0	3	4
Rhode Island	1	0	6	11	0	0	0	0
Connecticut	7	0	7	3	0	0	0	4
Middle Atlantic States:								
New York	64	10	67	83	0	0	17	41
New Jersey	8	2	17	16	0	0	9	11
Pennsylvania	22	6	78	59	0	0	43	24
East North Central States:								
Ohio	50	14	69	69	1	1	72	28
Indiana	7	1	24	11	1	0	7	20
Illinois	46	19	42	82	1	3	20	25
Michigan	31	3	93	51	0	0	15	5
Wisconsin	13	1	19	69	1	0	2	1
West North Central States:								
Minnesota	14	2	20	18	0	0	0	2
Iowa [3]	14	2	15	10	4	2	8	8
Missouri	29	1	30	19	1	2	17	27
North Dakota	0	0	11	3	0	0	3	0
South Dakota	0	0	13	4	0	0	0	0
Nebraska	19	0	3	5	0	1	1	0
Kansas	15	1	18	17	0	1	8	19
South Atlantic States:								
Delaware [3]	1	1			0	0	1	0
Maryland [2 4]	7	0	7	11	0	0	18	9
District of Columbia	3	1	1	0	0	0	2	0
Virginia [2]	2	5	3	12	0	0	20	19
West Virginia	7	1	29	12	0	0	16	9
North Carolina [2 3]	4	0	15	24	0	0	23	26
South Carolina [3]	1	1	1		0	0	8	18
Georgia [3]	4	10	12	10	0	0	20	38
Florida [3]	1	4		4	0	0	0	2

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Aug. 28, 1937, and Aug. 29, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Aug. 28, 1937	Week ended Aug. 29, 1936	Week ended Aug. 28, 1937	Week ended Aug. 29, 1936	Week ended Aug. 28, 1937	Week ended Aug. 29, 1936	Week ended Aug. 28, 1937	Week ended Aug. 29, 1936
East South Central States:								
Kentucky	4	7	42	13	1	0	49	56
Tennessee	5	19	17	8	0	0	32	33
Alabama [3]	4	16	4	18	18	0	8	36
Mississippi [3 4]	8	15	2	8	0	0	9	9
West South Central States:								
Arkansas	7	0	11	2	0	0	37	12
Louisiana [3]	4	0	2	7	0	0	23	23
Oklahoma [5]	25	0	12	7	0	0	24	16
Texas [3]	34	1	16	15	0	0	60	43
Mountain States:								
Montana [2]	1	0	6	4	16	8	1	5
Idaho	0	0	3	1	4	0	1	2
Wyoming	10	0	1	4	0	1	0	1
Colorado	28	2	8	6	0	0	9	1
New Mexico	1	1	2	9	0	0	15	13
Arizona	2	0	1	1	0	0	3	4
Utah [4]	1	0	12	10	1	2	2	0
Pacific States								
Washington	5	2	14	15	12	0	4	3
Oregon	0	0	7	16	8	0	3	2
California	44	12	59	65	3	0	13	12
Total	622	164	843	844	72	21	633	614
First 34 weeks of year	4,054	1,618	165,702	179,550	8,046	5,976	8,818	7,894

[1] New York City only.
[2] Rocky Mountain spotted fever, week ended Aug. 28, 1937, 5 cases, as follows Iowa, 1; Maryland, 1; Virginia, 1, North Carolina, 1; Montana, 1
[3] Typhus fever, week ended Aug 28, 1937, 76 cases, as follows. Delaware, 1; North Carolina, 1; South Carolina, 3, Georgia, 17; Florida, 4; Alabama, 20, Mississippi, 2; Louisiana, 3, Texas, 25.
[4] Week ended earlier than Saturday
[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June 1937										
New Mexico	1	13	4	1	208	2	0	69	2	8
July 1937										
Alabama	21	35	37	832	69	60	9	22	2	61
Arkansas	10	29	20	824	30	80	172	32	0	206
Florida	10	18	1	161	35	10	1	12	0	12
Georgia	3	27	10	723	10	172	16	40	0	199
Kansas	2	13	4	2	31		29	124	18	57
Louisiana	5	23	87	184	6	10	27	21	0	99
Maine	1	3	2		84	3	11	20	0	7
Mississippi	4	39	716	7,526	345	516	88	14	5	87
Missouri	6	39	144	390	269	5	64	208	26	138
Montana	2	3	2		30		2	36	53	4
Nevada	2	1					0	6	0	0
New Mexico		6	6	3	167	3	3	19		14
Oklahoma	7	20	32	236	69	40	189	52	3	141
Oregon	1	6	34	7	31		1	42	25	11
Rhode Island	3	2			52		0	37	0	0
Texas	12	116	267	2,786	639	184	184	154		291

Summary of monthly reports from States—Continued

June 1937

	Cases
New Mexico:	
Chicken pox	45
Dysentery (amoebic)	1
Dysentery (bacillary)	1
Food poisoning	4
German measles	3
Mumps	16
Ophthalmia neonatorum	2
Puerperal septicemia	1
Whooping cough	83
Rhode Island:	
Undulant fever	2

July 1937

	Cases
Actinomycosis:	
Montana	1
Anthrax:	
Louisiana	1
Texas	4
Beriberi:	
Florida	1
Chicken pox:	
Alabama	10
Arkansas	11
Florida	10
Georgia	20
Kansas	19
Maine	89
Mississippi	178
Missouri	54
Montana	51
Nevada	6
New Mexico	7
Oklahoma	16
Oregon	56
Rhode Island	17
Texas	105
Conjunctivitis:	
Georgia (acute infectious)	2
Oklahoma	1
Dengue:	
Florida	1
Texas	20
Dysentery:	
Alabama (amoebic)	3
Arkansas (amoebic)	33
Florida	3
Georgia (amoebic)	11
Georgia (bacillary)	83
Kansas (amoebic)	7
Louisiana (amoebic)	8
Mississippi (amoebic)	134
Mississippi (bacillary)	1,483
Missouri	102
New Mexico (unspecified)	3
New Mexico (amoebic)	2
New Mexico (bacillary)	14
Oklahoma	108
Oregon (amoebic)	3
Texas (amoebic)	5
Texas (bacillary)	636
Encephalitis, epidemic or lethargic:	
Kansas	2
Maine	1
Missouri	2
Montana	1
New Mexico	1
Oklahoma	2
German measles:	
Alabama	2
Florida	1
Kansas	14
Maine	13
Montana	3
New Mexico	2
Rhode Island	3
Hook worm disease:	
Florida	890
Georgia	320
Louisiana	17
Mississippi	542
Impetigo contagiosa:	
Montana	7
Oklahoma	1
Oregon	19
Jaundice, infectious:	
Oregon	28
Mumps:	
Alabama	57
Arkansas	28
Florida	18
Georgia	34
Kansas	110
Maine	78
Mississippi	243
Missouri	45
Montana	29
New Mexico	19
Oklahoma	9
Oregon	23
Rhode Island	7
Texas	351
Ophthalmia neonatorum:	
Alabama	2
Mississippi	7
Missouri	1
New Mexico	1
Oklahoma	1
Paratyphoid fever:	
Florida	1
Georgia	3
Kansas	6
Louisiana	1
Texas	23
Puerperal septicemia:	
Georgia	2
Mississippi	23
Rabies in animals:	
Alabama	60
Louisiana	10
Maine	2
Mississippi	30
Missouri	25
Oregon	6
Rhode Island	1
Rabies in man:	
Alabama	1
Florida	3
Mississippi	1
Rocky Mountain spotted fever:	
Arkansas	3
Montana	5
Oregon	6
Rhode Island	2
Scabies:	
Montana	1
Oklahoma	1
Oregon	24
Septic sore throat:	
Georgia	16
Kansas	1
Louisiana	1
Maine	1
Missouri	43
Montana	6
New Mexico	1
Oklahoma	77
Oregon	4
Rhode Island	5
Tetanus:	
Alabama	8
Florida	1
Georgia	9
Louisiana	3
Missouri	2
Oklahoma	1
Trachoma:	
Georgia	1
Kansas	1
Mississippi	1
Missouri	84
Montana (delayed reports)	53
New Mexico	3
Oklahoma	2
Tularemia:	
Alabama	1
Arkansas	12
Florida	3
Louisiana	4
Missouri	2
Montana	3
Nevada	3
Oregon	2
Texas	6
Typhus fever:	
Alabama	74
Florida	19
Georgia	145
Louisiana	1
Mississippi	5
Texas	56
Undulant fever:	
Alabama	3
Arkansas	6
Florida	1
Georgia	9
Kansas	10
Louisiana	6
Maine	1
Missouri	4
Nevada	1
Oklahoma	45
Oregon	3
Texas	15
Vincent's infection:	
Florida	4
Kansas	4
Maine	7
Oklahoma	4
Oregon	17
Whooping cough:	
Alabama	234
Arkansas	163
Florida	65
Georgia	219
Kansas	386
Louisiana	67
Maine	126
Mississippi	869
Missouri	534
Montana	93
Nevada	2
New Mexico	181
Oklahoma	139
Oregon	152
Rhode Island	101
Texas	1,288

FATAL CASE OF PLAGUE IN FRESNO COUNTY, CALIF.

Dr. W. M. Dickie, Director of Public Health of California, under date of August 30, 1937, reported a fatal case of human plague in Fresno County, Calif.

PLAGUE INFECTION IN FLEAS AND LICE, ORMSBY COUNTY, NEV.

Under date of August 30, 1937, Senior Surgeon C. R. Eskey reported that plague had been demonstrated in a lot of 134 fleas and 4 lice collected from 3 ground squirrels (*Citellus beecheyi*) shot 13 miles west of Carson City, Ormsby County, Nev., on August 20, 1937.

TYPHOID FEVER IN PORTSMOUTH, OHIO, TRACED TO USE OF RAW MILK

According to later information [1] furnished by Dr. J. P. Leake, of the Public Health Service, the outbreak of typhoid fever in Portsmouth, Ohio, has been traced to the use of raw milk. Investigation showed that 61 percent of the cases occurred in persons supplied by a raw-milk dairy which distributed only 1 percent of the milk used in the city. Since the middle of June and up to September 3, there had been 68 cases in the city and 21 in the county outside the city, with 3 deaths.

WEEKLY REPORTS FROM CITIES

City reports for week ended Aug. 21, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	117	50	13	247	277	270	4	356	110	1,115	....
Current week [1]	83	22	11	304	280	233	6	355	91	1,201	....
Maine:											
Portland	0	......	0	0	0	1	0	0	0	12	20
New Hampshire:											
Concord	0	......	0	0	3	0	0	0	0	0	17
Manchester	0	......	0	0	1	0	0	0	0	0	31
Nashua	0	......	....	0	....	1	0	....	0	5	9
Vermont:											
Barre	0	......	0	0	1	0	0	0	0	0	3
Burlington	0	......	0	0	0	0	0	0	0	0	8
Rutland	0	......	0	0	0	0	0	0	0	0	9
Massachusetts:											
Boston	1	......	1	4	11	10	0	8	1	23	177
Fall River	0	......	0	1	0	0	0	2	0	22	32
Springfield	0	......	0	0	0	0	0	1	0	5	35
Worcester	0	......	0	1	3	8	0	1	0	10	41
Rhode Island:											
Pawtucket	0	......	0	0	0	1	0	0	0	0	20
Providence	0	......	0	0	2	1	0	2	1	14	46
Connecticut:											
Bridgeport	1	......	0	0	2	1	0	0	0	0	33
Hartford	0	......	0	2	3	2	0	1	0	1	36
New Haven	0	1	0	0	0	0	0	1	0	2	28

[1] Figures for Cincinnati and Los Angeles estimated; reports not received.

[1] See Public Health Reports for Sept. 3, 1937, p. 1241.

City reports for week ended Aug. 21, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
New York:											
Buffalo	0	------	0	0	1	5	0	5	0	24	112
New York	17	1	1	72	55	23	1	69	18	105	1,185
Rochester	0	------	0	1	3	1	0	1	0	11	67
Syracuse	0	------	0	1	0	0	0	1	0	19	39
New Jersey:											
Camden	0	------	1	0	1	0	0	1	0	0	30
Newark	0	------	0	0	1	1	0	13	1	17	87
Trenton	0	------	0	2	3	0	0	3	0	0	30
Pennsylvania:											
Philadelphia	0	1	1	3	13	12	0	20	5	41	372
Pittsburgh	4	------	0	16	8	6	0	12	3	47	152
Reading	0	------	0	0	1	0	0	0	0	1	17
Scranton	0	------	------	0	------	0	0	------	0	3	------
Ohio:											
Cincinnati	------	------	------	------	------	------	------	------	------	------	------
Cleveland	4	1	0	29	8	13	0	9	8	43	171
Columbus	1	------	0	1	4	1	0	2	5	5	86
Toledo	0	------	0	5	2	2	0	7	8	28	85
Indiana:											
Anderson	0	------	0	1	1	0	0	1	0	0	14
Fort Wayne	0	------	0	0	1	0	0	0	0	0	25
Indianapolis	0	------	0	1	6	0	0	2	1	18	113
Muncie	0	------	0	0	0	0	0	0	0	0	7
South Bend	0	------	0	0	0	0	0	0	0	0	11
Terre Haute	0	------	0	0	0	2	0	0	0	1	15
Illinois:											
Alton	0	------	0	0	0	0	0	0	0	0	5
Chicago	4	4	1	47	24	32	0	39	2	77	699
Elgin	0	------	0	0	0	0	0	0	0	3	10
Moline	0	------	0	0	0	0	0	1	0	6	7
Springfield	0	------	0	0	1	1	0	0	1	1	21
Michigan:											
Detroit	8	------	0	22	8	29	0	15	2	97	243
Flint	------	0	0	0	1	4	0	0	4	4	28
Grand Rapids	1	------	0	2	1	1	0	0	0	15	26
Wisconsin:											
Kenosha	0	------	0	0	0	1	0	0	0	1	11
Madison	1	------	0	0	0	3	0	0	0	10	16
Milwaukee	0	------	0	27	5	4	0	4	0	43	109
Racine	0	------	0	0	0	0	0	0	0	3	13
Superior	0	------	0	0	0	0	0	0	0	0	7
Minnesota:											
Duluth	1	------	0	0	0	0	0	2	0	4	32
Minneapolis	0	------	0	2	0	11	0	2	1	16	78
St. Paul	0	------	0	0	3	1	0	2	1	35	50
Iowa:											
Cedar Rapids	0	------	------	1	------	0	0	------	0	1	------
Davenport	0	------	------	0	------	0	1	------	0	0	------
Des Moines	0	------	------	0	------	1	0	------	0	0	35
Sioux City	0	------	------	0	------	5	0	------	0	2	------
Waterloo	0	------	------	1	------	1	0	------	0	0	------
Missouri:											
Kansas City	0	------	0	2	1	4	0	4	0	6	83
St. Joseph	0	------	0	0	1	2	0	0	0	0	25
St. Louis	8	------	0	19	6	15	1	9	6	8	196
North Dakota:											
Fargo	0	------	0	0	1	0	1	0	0	36	13
Grand Forks	0	------	------	0	------	0	0	------	1	0	------
Minot	1	------	0	0	0	0	0	0	0	0	6
South Dakota:											
Aberdeen	0	------	------	0	------	1	0	------	0	6	------
Nebraska:											
Omaha	1	------	0	1	2	1	0	1	0	8	42
Kansas:											
Lawrence	0	------	0	1	0	0	0	0	0	2	8
Topeka	0	------	0	1	0	1	0	0	0	13	18
Wichita	0	------	0	0	2	0	0	1	1	2	20
Delaware:											
Wilmington	0	------	0	0	4	0	0	0	0	5	23
Maryland:											
Baltimore	3	------	0	1	6	2	0	12	7	83	195
Cumberland	0	------	0	0	0	0	0	0	0	0	16
Frederick	0	------	0	0	0	0	0	0	0	0	2
Dist. of Col.:											
Washington	3	------	0	5	5	2	0	10	3	1	169

City reports for week ended Aug. 21, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Virginia:											
Lynchburg	0	------	0	0	2	0	0	0	1	1	15
Norfolk	0	------	0	0	1	1	0	0	0	0	21
Richmond	1	------	0	0	1	0	0	0	0	0	40
Roanoke	1	------	0	0	0	0	0	0	0	0	7
West Virginia:											
Charleston	1	------	0	0	2	0	0	0	0	0	16
Huntington	1	------	------	0	------	1	0	------	0	0	------
Wheeling	0	------	0	1	2	1	0	0	0	10	28
North Carolina:											
Gastonia	0	------	------	0	------	0	0	------	0	1	------
Raleigh	0	------	0	0	1	0	0	1	0	0	21
Wilmington	0	------	0	0	0	0	0	0	0	20	13
Winston-Salem	1	------	0	1	1	2	0	0	1	15	21
South Carolina:											
Charleston	0	1	0	0	2	2	0	1	0	0	20
Florence	0	------	0	0	1	1	0	1	0	0	19
Greenville	0	------	1	0	1	0	0	0	0	0	12
Georgia:											
Atlanta	6	1	0	0	4	3	0	8	0	23	78
Brunswick	0	------	0	0	0	0	0	1	0	4	5
Savannah	1	1	0	0	0	0	0	2	1	4	31
Florida:											
Miami	1	------	0	7	0	0	0	4	3	2	42
Tampa	1	1	1	2	0	0	0	1	0	0	25
Kentucky:											
Covington	0	------	0	1	0	1	0	0	0	0	10
Lexington	0	------	0	0	1	0	0	1	0	7	20
Louisville	0	1	0	11	2	8	0	3	0	32	77
Tennessee:											
Knoxville	0	------	0	0	1	0	0	0	0	0	23
Memphis	1	------	2	8	1	0	0	3	1	3	70
Nashville	1	------	0	1	4	0	0	2	3	13	47
Alabama:											
Birmingham	2	------	0	0	2	0	0	4	0	0	67
Mobile	1	------	0	0	0	0	0	1	1	0	18
Montgomery	1	1	------	0	------	0	0	------	0	4	------
Arkansas:											
Fort Smith	0	------	------	0	------	2	0	------	0	0	------
Little Rock	0	------	0	0	1	0	0	1	1	1	3
Louisiana:											
Lake Charles	0	------	0	0	0	1	0	0	3	0	4
New Orleans	2	1	0	0	9	3	0	16	3	6	130
Shreveport	0	------	0	0	0	0	0	1	0	0	24
Oklahoma:											
Oklahoma City	0	------	0	0	2	1	0	1	2	0	38
Texas:											
Dallas	2	1	1	0	1	2	0	1	0	11	61
Fort Worth	0	------	0	0	0	0	0	0	0	13	26
Galveston	0	------	0	0	0	0	0	2	0	0	14
Houston	1	5	0	0	2	0	0	4	1	3	92
San Antonio	2	------	0	1	2	0	0	9	0	0	56
Montana:											
Billings	0	------	0	0	2	1	0	0	2	0	10
Great Falls	0	------	0	0	0	1	1	0	0	6	4
Helena	0	------	0	0	0	3	0	0	0	0	2
Missoula	0	------	0	0	0	1	0	0	0	0	2
Idaho:											
Boise	0	------	0	0	2	0	0	0	0	0	8
Colorado:											
Colorado Springs	0	------	0	3	1	0	0	0	0	2	7
Denver	0	------	1	4	9	2	0	5	0	9	78
Pueblo	0	------	0	0	1	1	0	0	1	0	14
New Mexico:											
Albuquerque	0	------	0	0	1	0	0	3	0	1	17
Utah:											
Salt Lake City	0	------	0	3	2	3	0	0	0	15	32
Washington:											
Seattle	0	------	0	5	1	0	0	1	1	18	59
Spokane	0	------	0	1	2	1	0	0	0	6	15
Tacoma	0	------	0	0	2	0	0	1	0	2	24
Oregon:											
Portland	0	------	0	0	2	0	3	3	0	1	67
Salem	0	------	------	0	------	0	0	------	0	1	------
California:											
Los Angeles	------	------	------	------	------	------	------	------	------	------	------
Sacramento	1	------	0	3	0	1	0	0	0	10	22
San Francisco	0	1	0	3	7	1	0	0	0	36	149

City reports for week ended Aug. 21, 1937—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	0	1	19
Worcester	1	0	0
Rhode Island:			
Providence	0	0	1
New York:			
Buffalo	0	0	6
New York	5	1	21
New Jersey:			
Newark	0	0	1
Pennsylvania:			
Philadelphia	0	1	5
Pittsburgh	0	0	3
Ohio:			
Cleveland	1	0	10
Columbus	0	0	3
Toledo	0	0	2
Indiana:			
Anderson	1	0	0
Fort Wayne	0	0	1
Indianapolis	0	0	1
Illinois:			
Alton	0	1	0
Chicago	2	2	31
Elgin	0	0	1
Michigan:			
Detroit	1	0	11
Grand Rapids	0	0	1
Wisconsin:			
Kenosha	0	0	1
Milwaukee	0	0	4
Racine	1	1	0
Minnesota:			
Duluth	0	0	1
Minneapolis	0	0	3
St. Paul	1	0	1
Missouri:			
Kansas City	0	0	5
St. Louis	0	0	1
Nebraska:			
Omaha	1	0	13
Kansas:			
Wichita	0	0	1
Maryland:			
Baltimore	2	1	4
District of Columbia:			
Washington	3	0	3
South Carolina:			
Greenville	0	1	6
Georgia:			
Atlanta	0	0	2
Kentucky:			
Lexington	0	0	1
Louisville	1	0	0
Tennessee:			
Memphis	0	0	1
Alabama:			
Birmingham	1	1	0
Mobile	0	0	1
Texas:			
Dallas	0	0	1
Houston	1	1	2
Montana:			
Great Falls	0	0	1
Colorado:			
Denver	0	0	1
Pueblo	1	1	1

Encephalitis, epidemic or lethargic.—Cases: Boston, 1; New York, 1; St. Louis, 13; Atlanta, 1; Houston, 1.

Pellagra.—Cases: Chicago, 1; Charleston, S. C., 1; Atlanta, 2; Savannah, 2; Louisville, 2; New Orleans, 2.

Typhus fever.—Cases: New York, 1; Des Moines, 1; Charleston, S. C., 3, Atlanta, 1; Montgomery, 1; Fort Worth, 1; San Antonio, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended August 14, 1937.—During the 2 weeks ended August 14, 1937, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	1		1	4					1	7
Chicken pox				43	82	7	34	6	6	178
Diphtheria		1		72	8	6	3	1		91
Dysentery				3						3
Erysipelas		1		3	5	3		1	1	14
Influenza	1				1				15	17
Leprosy			1							1
Measles		8	66	100	294	12	33	45	37	595
Mumps					24	8	1		10	43
Paratyphoid fever					10					10
Pneumonia	7				6		23		12	48
Poliomyelitis		9		12	130	17	3	5		176
Scarlet fever		4	9	79	95	10	24	23	10	254
Trachoma							2		5	7
Tuberculosis	11	28	56	95	44	4	46		33	317
Typhoid fever			1	51	14	1	3	1	1	72
Undulant fever				1			1			2
Whooping cough				231	287	72	43	1	46	680

ITALY

Communicable diseases—4 weeks ended June 20, 1937.—During the 4 weeks ended June 20, 1937, cases of certain communicable diseases were reported in Italy as follows:

Disease	May 24–30		May 31–June 6		June 7–13		June 14–20	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	16	15	11	10	16	16	27	21
Cerebrospinal meningitis	24	21	25	17	16	15	29	28
Chicken pox	518	208	533	212	467	201	325	162
Diphtheria	407	203	451	221	375	197	357	182
Dysentery	13	11	12	8	26	15	31	11
Hookworm disease	17	10	10	9	22	9	7	6
Lethargic encephalitis	1	1	5	5			2	2
Measles	1,610	379	1,729	392	1,447	353	1,508	352
Mumps	285	114	288	111	272	118	248	101
Paratyphoid fever	33	28	39	36	67	44	67	59
Poliomyelitis	37	28	40	35	41	80	78	54
Puerperal fever	87	85	20	20	30	27	26	24
Rabies	1	1	1	1				
Scarlet fever	365	133	336	120	334	135	267	112
Typhoid fever	257	169	271	159	356	199	379	191
Undulant fever	135	97	158	91	157	94	140	99
Whooping cough	691	188	714	224	722	226	715	211

SWEDEN

Vital statistics—1936.—Following are vital statistics for Sweden for the year 1936:

Number of births	88, 672
Births per 1,000 population	14. 17
Deaths (estimated)	74, 860
Deaths per 1,000 population	11. 96
Marriages	53, 265

VENEZUELA

Vital statistics—1936.—The following table shows the births and deaths in Venezuela during the year 1936:

	Number	Rate per 1,000 population
Population	3, 233, 391	
Marriages	10, 393	
Births	106, 497	32. 94
Deaths	57, 844	17. 89
Maternal deaths	364	[1] 3. 41
Deaths from—		
Cancer and other malignant tumors	676	. 21
Diarrhea and enteritis (under 2 years)	2, 580	[1] 23. 97
Dysentery	450	. 14
Malaria	2, 224	. 69
Tetanus, infantile	400	[1] 3. 76
Tuberculosis, pulmonary	2, 877	. 89

[1] Per 1,000 births.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for Aug. 27, 1937, pp. 1191–1205. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued Sept. 24, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

China.—Cholera has been reported in China as follows: Week ended August 14, 1937, Canton, 48 cases; week ended August 21, 1937, Hong Kong, 433 cases, Macao, 108 cases.

Indochina—Kwangchow Wan.—On August 6, 1937, seven cases of cholera were reported in Kwangchow Wan, Indochina.

Plague

Argentina—Salta Province—Esteco.—During the period August 1–15, 1937, one case of plague was reported in Esteco, Salta Province, Argentina.

Bolivia—La Paz Department—Loayza Province.—During the month of June 1937, two cases of plague were reported in Loayza Province, La Paz Department, Bolivia.

Indochina—Pnom-Penh.—During the week ended June 26, 1937, one case of plague was reported in Pnom-Penh, Indochina.

Hawaii Territory—Island of Hawaii—Hamakua District—Hamakua Mill Sector.—Plague infection has been proved in one lot of five rats and one lot of three mice found on August 13, also in one rat found August 17, 1937, all in Hamakua Mill Sector, Hamakua District, Island of Hawaii, Hawaii Territory.

United States—California—Fresno County—Nevada—Ormsby County.—A report of a fatal case of human plague in Fresno County, California, appears on page 1289, and of plague infection in fleas in Ormsby County, Nevada, on page 1289 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

Egypt—Port Said.—During the week ended July 24, 1937, one case of smallpox was reported in Port Said, Eygpt.

Unfederated Malay States—Kedah.—On July 22, 1937, smallpox was reported present in Kedah State, Unfederated Malay States.

Yellow fever

Colombia—Boyaca Department—Borbur.—During the week ended July 24, 1937, two deaths from yellow fever were reported in Borbur, Boyaca Department, Colombia.

Gold Coast—Accra.—On August 25, 1937, one case of yellow fever was reported in Accra, Gold Coast.

Senegal.—Yellow fever has been reported in Senegal as follows: August 21, one death at Diourbel; August 23, one case at Gossas.

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THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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DISABLING ILLNESS AMONG INDUSTRIAL EMPLOYEES IN 1936 AS COMPARED WITH EARLIER YEARS

By DEAN K. BRUNDAGE, *Senior Statistician, United States Public Health Service, Division of Industrial Hygiene, National Institute of Health* *

This report for the calendar year 1936 is the sixteenth annual report of a series pertaining to disabling illness.[1] It relates to the average frequency of new cases of sickness and nonindustrial injuries causing absence from work for more than 1 week among approximately 171,000 male and 15,000 female industrial employees in 1936 as compared with the 5 preceding years. The data were computed from periodic reports received from about 33 sick benefit associations or relief departments of establishments located east of the Mississippi and north of the Ohio and Potomac Rivers. The report makes available the average annual number of cases per 1,000 employees by sex and by cause of disability for two groups of establishments. Group A comprises all associations and companies which reported in the specified year regardless of whether they continued to report throughout the 6 years. Group B is a part of group A and is composed of 23 establishments which reported continuously through the 6 years ending December 31, 1936.

In table 1 are given, among other things, the incidence rates for disabilities lasting 8 consecutive calendar days or longer per 1,000 men for the broad classification of diseases for 1936, as compared with their respective average rates for the 5-year period, 1931–35. It will be observed that groups A and B, respectively, show approximately the same percentage increase in frequency. Thus for sickness and nonindustrial injuries the increases are 3 and 2 percent; for sickness, 4 and 3 percent; for respiratory diseases, 7 and 6 percent; and for nonrespiratory diseases, 2 and 1 percent. As indicated in the table, the rates by individual years for group B have been generally somewhat lower than for group A. However, since group B is a part of group A, and proportionate time changes in the rates of one group are similar to corresponding ones in the other group shown, the comparisons to follow will be restricted, unless otherwise stated, to group A.

* With the assistance of Miss E. S. Frasier, Junior Statistician.

[1] For the record 1921-30, inclusive, see Public Health Reports, 47: 995-1001 (Apr. 29, 1932).

TABLE 1.—*Frequency of specified causes of disability lasting 8 consecutive calendar days or longer among male industrial workers in various industries, by years from 1931 to 1936 inclusive* [1]

[Rates per 1,000 men]

Year in which disability began	Sickness and nonindustrial injuries [2]		Sickness		Respiratory diseases [3]		Sickness exclusive of influenza		Nonrespiratory diseases		Average number of men, all reporting establishments
	A	B	A	B	A	B	A	B	A	B	
1931	94.6	94.0	82.2	82.2	34.9	35.2	63.3	62.9	47.3	47.0	171,694
1932	97.5	95.3	84.9	83.5	37.6	37.3	62.9	61.5	47.3	46.2	163,979
1933	82.3	78.8	71.0	68.5	28.6	26.8	55.7	54.6	42.4	41.7	152,203
1934	78.1	76.3	65.8	64.4	24.5	24.0	55.7	54.2	41.3	40.4	174,643
1935	85.1	82.6	73.9	71.5	29.3	28.2	61.2	59.3	44.6	43.3	157,959
1936	90.3	87.4	78.8	76.0	33.2	32.0	63.7	61.4	45.6	44.0	170,680
5 preceding years [4]	87.5	85.4	75.6	74.0	31.0	30.3	59.8	58.5	44.6	43.7	164,096

A = all reporting establishments, B = establishments which reported throughout the 6 years ending Dec. 31, 1936.

[1] For the record 1921 to 1930, inclusive, see reference given in footnote 1.
[2] Industrial accidents, venereal diseases, and a few numerically unimportant causes of disability are not reported.
[3] Title numbers 11, 23, 104–115a, in the International List of Causes of Death, fourth revision, Paris, 1929.
[4] 1931 to 1935 inclusive.

The frequency rate of new cases of sickness and nonindustrial injuries causing absence from work for more than 1 week among 170,680 male employees was 90.3 cases per 1,000 in 1936.[2] This was the highest rate during the period 1933–36, but well below the rates for 1931 and 1932. The rate for sickness exclusive of influenza was 63.7 cases per 1,000 men, which exceeded all corresponding annual rates during the past 6 years.

RESPIRATORY DISEASES

The respiratory group of diseases accounted for the major portion of the increase in the incidence of illness in 1936 as compared with the 2 former years. As shown in table 2, with the exception of tuberculosis of the respiratory system and diseases of the pharynx and tonsils, each respiratory disease subgroup occurred at a higher incidence rate in 1936 than in 1934 or 1935.

The frequency of influenza and grippe in 1936 (15.1 cases per 1,000 men) was 19 percent higher than the rate for 1935 (12.7 cases per 1,000 men) and 50 percent higher than for 1934 (10.1 cases per 1,000 men). Nevertheless, the rate for 1936 was 4 percent below the average rate (15.8) for the preceding 5-year period.

Another development of an unfavorable nature was an increase in the number of cases of bronchitis, acute and chronic. In 1936 this

[2] A report, "Sickness among male industrial employees during the final quarter of 1936 and the year as a whole", was published in the Public Health Reports for Apr. 30, 1937. Because of the inclusion of additional data subsequently reported, the rates for 1936 in this final report are somewhat lower than the preliminary annual rates given in the quarterly report.

disease occurred at a rate of 4.8 cases per 1,000 men, which was 41 percent above its average incidence during the years 1931–35, and exceeded any rate recorded for this disease since 1929. The incidence of diseases of the pharynx and tonsils in 1936, although 4 percent higher than in the preceding 5-year period, was below the rate for 1935. The rate for pneumonia (all forms) in 1936 (2.6 cases per 1,000 men) was 13 percent above the rate for 1935 (2.3 cases per 1,000 men), and, in turn, exceeded the rate for any year since 1929. Among the industrial policyholders of the Metropolitan Life Insurance Co., the death rate from this disease in 1936 as compared with 1935 increased 5 percent.[3]

TABLE 2.—*Frequency of specified respiratory diseases which caused disability for 8 consecutive calendar days or longer among male industrial workers in various industries, by years, from 1931 to 1936, inclusive* [1]

[Rates per 1,000 men]

Year in which disability began	Influenza or grippe (11)		Bronchitis, acute and chronic (106)		Diseases of the pharynx and tonsils (115a)		Pneumonia, all forms (107–109)		Tuberculosis of the respiratory system (23)		Other diseases of the respiratory system (104–105, 110–114)	
	A	B	A	B	A	B	A	B	A	B	A	B
1931	18.9	19.3	3.6	3.8	5.2	5.1	2.1	2.1	1.0	1.0	4.1	3.9
1932	22.0	22.0	3.6	3.7	4.5	4.4	2.0	1.9	1.0	1.0	4.5	4.3
1933	15.3	13.9	2.9	2.8	3.9	3.6	1.8	1.7	.8	.9	3.9	3.9
1934	10.1	10.2	3.2	3.2	4.3	3.8	2.0	2.1	.8	.8	4.1	3.9
1935	12.7	12.2	3.6	3.6	5.1	4.8	2.3	2.2	1.0	1.0	4.6	4.4
1936	15.1	14.6	4.8	4.7	4.8	4.4	2.6	2.6	.8	.8	5.1	4.9
5 preceding years	15.8	15.5	3.4	3.4	4.6	4.4	2.0	2.0	.9	.9	4.3	4.1

Numbers shown in parentheses are disease title numbers from the International List of Causes of Death, fourth revision, Paris, 1929.

A = all reporting establishments; B = establishments which reported throughout the 6 years ending Dec. 31, 1936.

[1] For the record 1921 to 1930, inclusive, see reference given in footnote 1.

"Other diseases of the respiratory system", including diseases of the upper respiratory tract, showed a sizable increase in frequency in 1936 as compared with all the former years included in table 2.

Most noteworthy in the record since 1921 is the downward trend in the new cases of tuberculosis of the respiratory system. The incidence has decreased from 1.9 cases per 1,000 in 1921 and 1922 to 0.8 case in 1936.[4] During the 6 years under discussion the annual sickness rates fluctuated about a mean of 0.9, with 3 rates above and 3 below the mean.

DIGESTIVE DISEASES

For the digestive disease group as a whole (table 3) the frequency rate of cases in 1936 was slightly higher than that for 1935 and that for the preceding 5-year period. With the exception of "other digestive

[3] Statistical Bulletin, Metropolitan Life Insurance Co., New York, 18:11 (February 1937).

[4] Public Health Reports, 47: 998 (Apr. 29, 1932).

diseases" the same observation holds for all subgroups of diseases of the digestive system.

NONRESPIRATORY, NONDIGESTIVE DISEASES

As a group the nonrespiratory, nondigestive diseases showed relatively little change in occurrence since 1935, and the rate for 1936 corresponded very closely to the preceding 5-year average. The only subgroup of these diseases which showed a sensible increase in rates in 1936 over the average for 1931–35 were diseases of the circulatory system except diseases of the veins, and "ill-defined and unknown causes of disability." While not recording spectacular changes, diseases of the ears and of the mastoid process; nephritis, acute and chronic; diseases of the organs of vision; and cancer (all forms) showed downward trends during the years under consideration.

TABLE 3.—*Frequency of specified diseases of the digestive system which caused disability for 8 consecutive calendar days or longer among male industrial workers in various industries, by years from 1931 to 1936 inclusive* [1]

[Rates per 1,000 men]

Year in which disability began	Digestive diseases total (115b–129)		Diseases of the stomach except cancer (117-118)		Diarrhea and enteritis (120)		Appendicitis (121)		Hernia (122a)		Other digestive diseases (115b, 116, 122b-129)	
	A	B	A	B	A	B	A	B	A	B	A	B
1931	13.4	13.1	4.0	3.8	1.2	1.1	3.7	3.6	1.8	1.8	2.7	2.8
1932	13.3	12.7	4.0	3.7	1.0	1.0	3.4	3.5	1.9	1.8	3.0	2.7
1933	12.1	11.3	3.3	3.4	1.0	1.0	3.3	3.2	1.3	1.3	3.2	2.4
1934	12.7	12.5	3.2	3.5	1.3	1.1	3.9	4.0	1.5	1.4	2.8	2.5
1935	12.9	12.5	3.6	3.6	1.1	1.0	4.0	3.9	1.4	1.4	2.8	2.6
1936	13.6	13.1	3.7	3.5	1.3	1.3	4.1	4.1	1.7	1.6	2.8	2.6
5 preceding years	12.9	12.4	3.6	3.6	1.1	1.1	3.7	3.6	1.6	1.5	2.9	2.6

Numbers in parentheses are disease title numbers from the International List of Causes of Death, fourth revision, Paris, 1929.
A = all reporting establishments; B = establishments which reported throughout the 6 years ending Dec. 31, 1936

[1] For the record 1921 to 1930, inclusive, see reference given in footnote 1.

Rheumatism, acute and chronic, which showed definite improvement in 1934 and 1935 (4.0 cases per 1,000 men) as compared with earlier years, increased to 4.2 cases per 1,000 in 1936. This rate was below the 5-year average. Diseases of the organs of locomotion except diseases of the joints occurred at a rate of 3.2 cases per 1,000 men in 1936, which exceeded the rates for 1933, 1934, and 1935, as well as the average for 1931–35.

The infectious and parasitic disease group, which is composed principally of the communicable diseases, had the favorable rate of 2.3 cases per 1,000 men. It is of interest to observe in this connection that the policyholders of the Metropolitan Life Insurance Co. showed a low mortality rate for the epidemic diseases listed during 1936 as compared with 1935.

Table 4.—*Frequency of specified nonrespiratory, nondigestive diseases which caused disability for 8 consecutive calendar days or longer among male industrial workers in various industries, by years from 1931 to 1936, inclusive* [1]

[Rates per 1,000 men]

Year in which disability began	Nonrespiratory, nondigestive diseases, total		Diseases of the circulatory system except diseases of the veins (90-99) (101-103)		Diseases of the veins (100)		Diseases of the heart (90-95)		Nephritis—acute and chronic (130-132)	
	A	B	A	B	A	B	A	B	A	B
1931	33.9	33.9	3.2	3.4	1.8	1.6	2.0	2.2	0.7	0.7
1932	34.0	33.5	3.7	3.9	1.8	1.7	2.5	2.7	.8	.7
1933	30.3	30.4	3.4	3.3	1.4	1.4	2.1	2.2	.5	.6
1934	28.6	27.9	3.0	3.0	1.5	1.4	2.0	2.0	.5	.6
1935	31.7	30.8	3.7	3.6	1.5	1.4	2.4	2.4	.5	.5
1936	32.0	30.9	3.7	3.4	1.6	1.6	2.3	2.3	.4	.4
5 preceding years	31.7	31.3	3.4	3.4	1.6	1.5	2.2	2.3	.6	.6

Year in which disability began	Other diseases of the genito-urinary system and annexa (133-138)		Neuralgia, neuritis, sciatica (87a)		Neurasthenia and the like (87b)		Other diseases of the nervous system (78-85)		Diseases of the organs of vision (88)	
	A	B	A	B	A	B	A	B	A	B
1931	2.3	2.3	2.1	2.1	1.5	1.5	1.1	1.3	1.0	0.9
1932	2.3	2.3	2.3	2.5	1.3	1.2	1.2	1.3	.9	.8
1933	2.2	2.2	2.1	2.0	.8	.8	1.4	1.3	.8	.9
1934	2.4	2.1	1.8	1.8	.8	.7	1.4	1.1	.8	.7
1935	2.7	2.5	2.3	2.3	1.2	1.0	1.3	1.2	.8	.8
1936	2.3	2.1	2.2	2.0	1.1	1.0	1.1	1.1	.8	.8
5 preceding years	2.4	2.3	2.1	2.1	1.1	1.1	1.3	1.2	.9	.8

Year in which disability began	Diseases of the ears and of the mastoid process (89)		Rheumatism, acute and chronic (56-57)		Diseases of the organs of locomotion except diseases of the joints (156b)		Diseases of the skin (151-153)		Infectious and parasitic diseases [2] (1-10, 12-22, 24-33, 36-44)	
	A	B	A	B	A	B	A	B	A	B
1931	0.7	0.6	5.4	5.4	3.3	3.6	3.2	3.2	3.3	2.9
1932	.7	.6	5.3	5.4	3.3	3.7	2.7	2.7	2.7	2.1
1933	.6	.6	4.9	5.0	2.8	3.0	2.7	2.7	2.0	1.9
1934	.5	.5	4.0	4.0	2.7	2.9	2.5	2.4	2.5	2.5
1935	.6	.5	4.0	4.0	2.7	2.8	2.7	2.7	3.0	2.8
1936	.5	.5	4.2	4.2	3.2	3.3	3.0	2.8	2.3	2.4
5 preceding years	.6	.6	4.7	4.8	3.0	3.2	2.8	2.8	2.7	2.4+

Year in which disability began	Cancer, all forms (45-53)		Other general diseases [3] (54, 55, 59, 77)		Diseases of the bones and joints (154-156a)		Ill-defined and unknown causes of disability (200)		Nonindustrial injuries (163-198)	
	A	B	A	B	A	B	A	B	A	B
1931	0.6	0.6	1.2	1.2	0.6	0.5	1.9	2.1	12.4	11.8
1932	.6	.6	1.7	1.7	.4	.4	2.3	1.9	12.6	11.8
1933	.5	.5	1.7	1.7	.5	.4	2.0	2.1	11.3	10.3
1934	.4	.4	1.9	1.9	.4	.3	1.5	1.6	12.3	11.9
1935	.5	.5	1.7	1.6	.5	.5	2.0	2.1	11.2	11.1
1936	.4	.4	1.8	1.7	.6	.5	2.8	2.7	11.5	11.4
5 preceding years	.5	.5	1.6	1.6	.5	.4	1.9	2.0	11.9	11.4

Numbers shown in parentheses are disease title numbers from the International List of the Causes of Death, fourth revision, Paris, 1929.

A = all reporting establishments; B = establishments which reported throughout the 6 years ending Dec. 31, 1936.

[1] For the record 1921 to 1930, inclusive, see reference given in footnote 1.

[2] Except influenza, respiratory tuberculosis, and the venereal diseases.

[3] Includes nutritional diseases, diseases of the endocrine glands, diseases of the blood and blood-making organs, chronic poisonings, and intoxication.

The frequency of nonindustrial injuries (11.5 cases per 1,000) was slightly greater in 1936 than in 1935, but lower than the average (11.9) for the preceding 5-year period.

WAS THE INCREASE IN DISABILITY IN 1936 DUE TO SELECTION?

Group B, which is composed of the identical 23 establishments throughout the past 6 years, showed a progressively decreasing number of male employees during the years 1931, 1932, and 1933. In 1934, 1935, and 1936, on the other hand, the number gradually increased. With the increase in the number employed there was a concomitant increase in the sickness rate. The following table contains the appropriate data:

Year	Average number of male employees	Annual number of cases per 1,000	Year	Average number of male employees	Annual number of cases per 1,000
1931	125,520	94.0	1934	122,552	76.3
1932	107,681	95.3	1935	125,727	82.6
1933	105,128	78.8	1936	145,916	87.4

It appears that an improvement in economic conditions paralleled an increase in the frequency of sickness. To account for this situation it may be hypothesized that, during the depression years, there was a general releasing of the older and less physically fit employees which led to a highly selected group in 1933 with necessarily low sickness rates; furthermore, pursuing the same thought, with a greater demand for employees in the later years the employed group gradually assumed its earlier complexion, together with higher sickness rates. The hypothesis is merely stated; to investigate its validity would require additional data which are not available.

FREQUENCY OF DISABILITY AMONG FEMALE EMPLOYEES IN 1936 AS COMPARED WITH FORMER YEARS

Because of the small number of years of exposure, the analyses for female employees are limited to rates for the broad disease groups. Most of the reporting establishments upon which this report is based pay no benefits for disabilities connected with diseases of pregnancy, childbirth, and the puerperal state; yet, on account of the difference in age distributions, the ratios of the female rates to the male rates are a crude comparison of the incidence of illness among the two sexes.

For the 15,000 female industrial employees covered in this report, an average of 144.4 per 1,000 women were disabled from sickness and nonindustrial injuries for 8 calendar days or longer during 1936 as compared with 90.3 males. Thus the ratio of the illness rate for

females to that for males is 1.6 to 1. As shown in table 5, the incidence rate for females in 1936 was slightly lower than in 1935 and 2 percent lower than for the preceding 5-year period. The rate for the respiratory disease group for 1936, 60.7 cases per 1,000 females, as compared with the rate for 1935, 50.4 cases per 1,000, showed an increase of 20 percent in frequency for these diseases, while the rate for the nonrespiratory disease group, 71.2 cases per 1,000 women, as compared with 80.3, revealed a decrease of 11 percent in 1936 as compared with 1935. Likewise the occurrence of nonindustrial injuries decreased in 1936.

TABLE 5.—*Frequency of specified causes of disability lasting 8 consecutive calendar days or longer among female industrial workers in various industries, by years from 1931 to 1936, inclusive*

[Rates per 1,000 women]

Year in which disability began	Sickness and nonindustrial injuries[1]	Percent of male rate	Sickness	Respiratory diseases[2]	Sickness exclusive of influenza	Nonrespiratory diseases	Nonindustrial injuries	Average number of women, all reporting establishments
1931	162.0	171	147.8	63 9	115 5	83 9	14 2	12,272
1932	158.4	162	143 6	71 6	101 1	72 0	14 8	13,520
1933	131 3	160	119 5	51.3	91.4	68.2	11 8	14,587
1934	143.6	184	131 1	52 9	108 2	78 2	12 5	15,644
1935	144 9	170	130 7	50 4	108.2	80.3	14 2	15,049
1936	144.4	160	131.9	60 7	104.2	71.2	12 5	15,181
5 preceding years	148.0	169	134.5	58 0	104.9	76.5	13 5	14,214

[1] Industrial accidents, venereal diseases, and a few numerically unimportant causes of disability are not reported.
[2] Title numbers 11, 23, 104-115a, in the International List of the Causes of Death, fourth revision, Paris, 1929.

OCCUPATIONAL DISEASES OCCURRING IN FACTORIES AND WORKSHOPS OF GREAT BRITAIN, 1936[1]

By WILLIAM M. GAFAFER, *Senior Statistician, United States Public Health Service*

The Annual Report of the Chief Inspector of Factories and Workshops of Great Britain for 1936[2] was published in July 1937, and is of more than ordinary interest to those engaged in industrial health work. It is appropriate to direct attention at this time to some of the material and in particular that concerned with occupational diseases. Data on the number of persons exposed are not available; the presentation will be limited, therefore, to the actual number of cases and deaths, and to certain relevant proportions.

[1] From the Division of Industrial Hygiene of the National Institute of Health, U. S. Public Health Service, Washington, D. C.
[2] H. M. Stationery Office, London, 1937; 107 pp. The chapter titles follow: General Report, Safety, Accidents to Young Workers, Health, Hours of Employment, Welfare, Piece-Work Particulars, Trucks, and Home Office Industrial Museum.

TABLE 1.—*Occupational diseases reported in 1936, with comparative data for 1935*

[Reported under sec. 73 of the Factory and Workshop Act of 1901, and under sec. 3 of the Lead Paint Act]

Disease	1936				1935			
	Cases		Deaths		Cases		Deaths	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	428	100.0	44	100.0	438	100.0	58	100.0
Lead poisoning	163	38.1	13	29.5	168	38.4	17	29.3
Epitheliomatous ulceration	142	33.2	27	61.4	171	39.0	38	65.5
Chrome ulceration	84	19.6			67	15.3		
Anthrax	30	7.0	1	2.3	20	4.6	3	5.2
Aniline poisoning	7	1.7	1	2.3	9	2.1		
Arsenical poisoning	1	.2	1	2.3	1	.2		
Chronic benzene poisoning	1	.2	1	2.2				
Mercurial poisoning					1	.2		
Carbon bisulphide poisoning					1	.2		
Phosphorus poisoning								
Manganese poisoning [1]								
Toxic jaundice								

[1] Became notifiable Aug. 1, 1936.

The occupational diseases reported in 1936 under the Factory and Workshop Act, and the Lead Paint Act are shown in table 1. Comparative data are included for the year 1935. There were reported 428 cases and 44 deaths in 1936, as compared with 438 cases and 58 deaths in 1935. Lead poisoning and epitheliomatous ulceration are well above the other causes with respect to both cases and deaths, and in both years. The percentages of all reported cases associated with lead were similar in both years, namely, approximately 38 percent. The proportions of deaths due to lead were also approximately the same in both years (29 percent). While the proportions of cases with epitheliomatous ulceration were in both years of the same magnitude as those associated with lead, the proportions dying in both years were over twice the corresponding proportions recorded for lead. In both years chrome ulceration and anthrax ranked third and fourth, respectively, with regard to proportion of cases.

Lead poisoning.—Table 2 shows the industrial origin of cases and deaths connected with lead poisoning. With respect to cases, the painting of buildings ranks first in both years, with 17 percent in 1936 and 19 percent in 1935; paint and color works, smelting of metals, and pottery follow in order, with between 10 and 12 percent in both years. In 1936 more than half of all reported deaths from lead poisoning were caused in the painting of buildings, with 8 percent in the smelting of metals and the same percentage in pottery making. In 1935 the painting of buildings and pottery each accounted for 7 deaths, with a percentage in each instance of 41.

TABLE 2.—*Industrial origin of lead poisoning*

Industry	1936				1935			
	Cases		Deaths		Cases		Deaths	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	163	100.0	13	100.0	168	100.0	17	100.0
Painting of buildings	27	16.6	7	53.8	32	19.1	7	41.2
Paint and color works	19	11.7			21	12.5		
Smelting of metals	19	11.7	1	7.7	17	10.1		
Pottery	18	11.0	1	7.7	18	10.7	7	41.2
Electric accumulator works	15	9.2			10	5.9		
Shipbreaking	11	6.7			10	5.9		
Coach and car painting	7	4.3			5	3.0	1	5.9
Other contact with molten lead	5	3.1			11	6.5		
White and red lead works	5	3.1	1	7.7	7	4.2		
Vitreous enamelling	5	3.1			1	.6		
Paint used in other industries	4	2.5	1	7.7	2	1.2		
Printing	3	1.8			4	2.4	1	5.9
Plumbing and soldering	3	1.8			3	1.8	1	5.8
Shipbuilding	3	1.8			3	1.8		
Indiarubber works	1	.6						
Tinning of metals								
Other industries	18	11.0	2	15.4	24	14.3		

TABLE 3.—*Industrial origin of epitheliomatous ulceration, chrome ulceration, and anthrax*

Disease and industry	1936				1935			
	Cases		Deaths		Cases		Deaths	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Epitheliomatous ulceration	142	100.0	27	100.0	171	100.0	38	100.0
Pitch and tar								
Tar distilling	42	29.6	4	14.8	48	28.1	3	7.9
Patent fuel works	31	21.8			27	15.8	2	5.3
Gas works	13	9.2	6	22.2	19	11.1	7	18.4
Other industries	7	4.9	2	7.4	7	4.1	3	7.9
Mineral oil:								
Cotton mule spinning	41	28.9	12	44.5	62	36.3	20	52.6
Other industries	5	3.5	3	11.1	5	2.9	1	2.6
Paraffin: Shale oil works	3	2.1			3	1.7	2	5.3
Chrome ulceration	84	100.0			67	100.0		
Chromium plating	66	78.6			48	71.6		
Chrome tanning	7	8.3			6	9.0		
Dyeing and finishing	6	7.1			7	10.4		
Manufacture of bichromates	1	1.2						
Other industries	4	4.8			6	9.0		
Anthrax	30	100.0	1	100.0	20	100.0	3	100.0
Wool	19	63.4			13	65.0	1	33.3
Hides and skins	9	30.0	1	100.0	5	25.0	1	33.3
Horsehair	1	3.3						
Other industries	1	3.3			2	10.0	1	33.4

Epitheliomatous ulceration.—Table 3 shows, among other things, the industrial origin of epitheliomatous ulceration. In both years over half of these cases occurred in connection with tar distilling and cotton mule spinning, about half of the deaths occurring in both years in cotton mule spinning.

Chrome ulceration.—Eighty-four and 67 cases were reported in 1936 and 1935, respectively (table 3). In both years over 70 percent of the cases were accounted for by chromium plating.

Anthrax.—Over 60 percent of the cases in both years occurred in wool handlers (table 3). Handlers of hides and skins contributed 30 and 25 percent of the cases in 1936 and 1935, respectively.

The foregoing material, which relates to cases, is presented graphically in figures 1 and 2.

It is of interest to observe that in 1936 there were no reports in connection with the following: Mercury, carbon bisulphide, phosphorus, and manganese.

Other data.—The report includes data on reported cases of gassing. A total of 153 cases and 12 deaths was reported in 1936, as compared with 120 cases and 13 deaths during the preceding year. Over half of

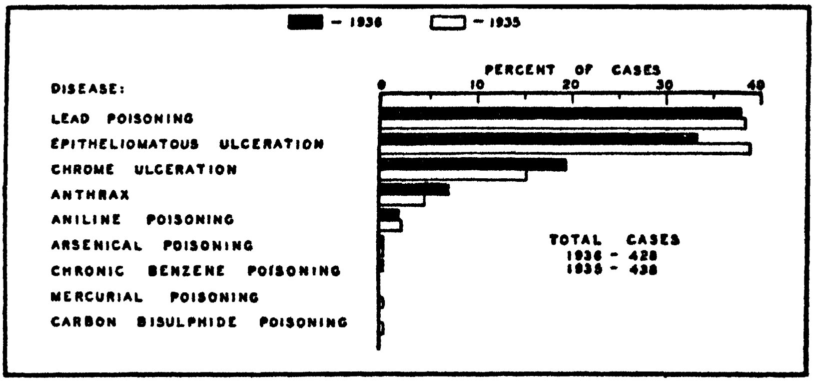

FIGURE 1.—Percentage distribution of cases of occupational diseases reported in 1936 under section 73 of the Factory and Workshop Act of 1901, and under section 3 of the Lead Paint Act, with comparative data for 1935.

the cases in both years were caused by carbon monoxide, particularly from blast-furnace gas. Each of the other causative agents, including, among others, trichlorethylene, nickel carbonyl, chlorine, nitrous fumes, and sulphuretted hydrogen, contributed less than 8 percent of the cases in both years.

Sixty-four deaths (50 in 1935) from silicosis and 62 (76 in 1935) from silicosis and tuberculosis were reported, together with 7 deaths (11 in 1935) from asbestosis and 4 (4 in 1935) from asbestosis and tuberculosis.

There were 1,771 (1,429 in 1935) voluntarily reported cases of dermatitis, the largest number occurring in both years among engineers (19 percent in 1936, 17 percent in 1935). The 3 most important

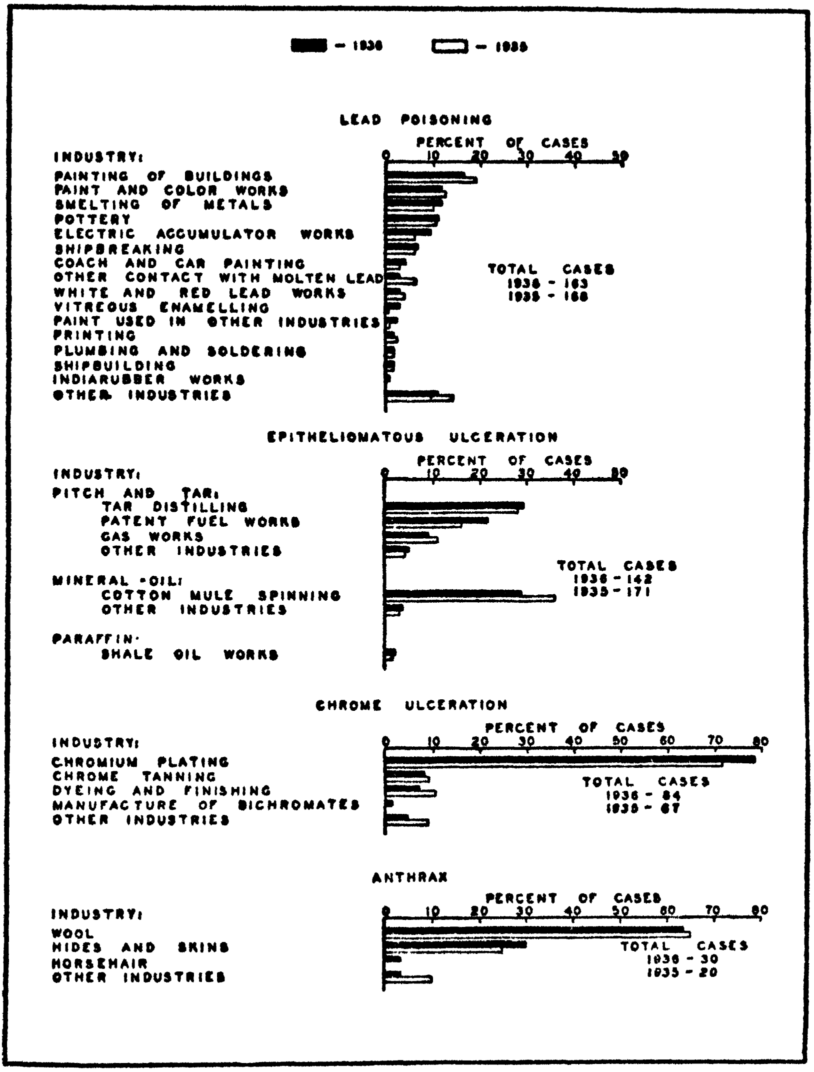

FIGURE 2.—Industrial origin, in 1936, of cases of lead poisoning, epitheliomatous ulceration, chrome ulceration, and anthrax, respectively, with comparative data for 1935.

agents responsible were oils, alkalis, and friction and heat, contributing in 1936 the following percentages of cases: 17, 15, and 11, respectively. In 1935 the corresponding figures were 15, 16, and 12.

REMOVAL OF FLUORIDE FROM WATER[1]

By Elias Elvove, *Senior Chemist, United States Public Health Service*

In considering the problem of the removal of fluoride from drinking water, it appeared desirable to find a substance the use of which would not leave in the water any element or group not ordinarily present in appreciable quantity; and which, likewise, would not impair the potability of the water by increasing any ordinary constituent to an undesirable concentration. Although the field from which to choose was thus narrowed, three substances[2] were found that appeared promising. These are tricalcium phosphate, magnesium oxide, and magnesium hydroxide.[3]

The results obtained with tricalcium phosphate and with magnesium hydroxide were qualitatively similar to those obtained with magnesium oxide. Since, however, the question of cost is very important, and since, at present, magnesium oxide appears as the least expensive,[4] experiments have been conducted mostly with this substance.

It seems reasonable to expect that different grades of commercial magnesium oxide would show different degrees of fluoride-removing power. Preliminary experiments indicated that this is actually the case; and while it appears probable that a magnesium oxide could be prepared for this special purpose which would have a fluoride-removing power considerably above that of the ordinary commercial grades, it is questionable whether from the point of view of cost, it might not be more economical to utilize a commercially inexpensive magnesium oxide even though its fluoride-removing power is, per given weight, relatively lower.

The results reported in this paper have been obtained with two different grades of magnesium oxide. The grade referred to as calcined magnesite was obtained from a business concern which uses it in the construction of cement floors. The other grade was a commercial sample of light magnesium oxide similar to that of the United States Pharmacopœia. In both cases, the magnesium oxides were used in the finely-divided condition as they are ordinarily sold.

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[1] From Division of Chemistry, National Institute of Health.

[2] Other substances have been reported in the literature; but since the present paper is intended as a brief note, it is not deemed necessary to discuss here the related literature on the subject. Some references to other published methods for the removal of fluoride from drinking water are, however, included in the list of references at the end of this paper.

[3] Scott, Kimberly, Van Horn, Ey, and Waring have reported (Am. Water Works Asso., January 1937, pp. 9-25) the reduction of the fluoride content of magnesium-containing waters by applying the ordinary lime softening treatment but over-treating with the lime to a causticity of about 2 grains per gallon.

A report describing methods for the removal of fluoride from water by means of tricalcium phosphate, magnesium oxide, or magnesium hydroxide, was forwarded by the writer to the Surgeon General on June 26, 1936, for consideration of the advisability of applying for letters patent, to protect the public interest and the right of any citizen of the United States to use these methods without payment of royalties.

[4] Calcined magnesite is quoted at about 3 cents per pound ($60 per ton) and tricalcium phosphate at 6.5 cents per pound in the March 1937 Market Report of Industrial and Engineering Chemistry. No comparable price on magnesium hydroxide is quoted. Light magnesium oxide complying with purity requirements of the United States Pharmacopoeia is quoted at 36 cents per pound.

One mode of operation may be illustrated by the following described experiments. The fluoride-containing water to be treated was introduced into tall bottles so as nearly to fill them to the beginning of the curved portion. The quantity of the magnesium oxide used corresponded to one ounce per gallon of water in each bottle. The magnesium oxide and water were then actively agitated, by means of a current of air, for about half an hour. After complete settling,[5] about three-fourths of the column of water was siphoned off, replaced by a fresh supply of the fluoride-containing water, and the process repeated.

The water used in these experiments was prepared by adding sufficient sodium fluoride to distilled water to make its fluoride content 5 parts per million. On the basis of quantitative epidemiological studies (*1*, *2*), such a fluoride concentration in a drinking water would be expected to produce a high incidence of mottled enamel when used continuously by children during the susceptible age period. The fluoride was estimated with the aid of the zirconium-alizarin reagent (*3*). The results obtained are summarized in the accompanying tables.

TABLE 1.—*Comparative results with a commercial calcined magnesite and a commercial light magnesium oxide*

Number of times the MgO was used in this series (A)	Fluoride (F) content before treatment (B)	Fluoride after treatment with the calcined magnesite (C)	Fluoride removed[1] (D)	Fluoride after treatment with the light magnesium oxide (E)	Fluoride removed (F)
	Parts per million				
1	5	0.2	4.8	0.2	4.8
2	5	.7	4.3	.4	4.6
3	5	.7	4.3	.6	4.4
4	5	1.7	3.3	.9	4.1
5	5	1.9	3.1	1.3	3.7
6	5	2.5	2.5	1.3	3.7
7	5	2.1	2.9	1.7	3.3
8	5	2.7	2.3	1.8	3.2
9	5	2.2	2.8	1.9	3.1
10	5	2.1	2.9	1.7	3.3
11	5	2.1	2.9	1.7	3.3
12	5	3.5	1.5	1.9	3.1
13	5	3.0	2.0	2.0	3.0
14	5	4.5	.5	2.3	2.7
15	5	4.0	1.0	2.2	2.8
16	5	4.2	.8	3.0	2.0
17	5	4.0	1.0	3.0	2.0

[1] Application of a similar procedure to a natural water showing about 419 p. p. m. of total solids, 58 SiO_2, 47 Ca, 45 Mg, 358 HCO_3, 48 SO_4, 2.8 NO_3, 10 Cl, and 3.5 p. p. m. of fluoride, reduced the fluoride content to 0.6, 0.6, and 0.9 p. p. m. in the first, second, and third runs, respectively.

[5] This usually required standing overnight

TABLE 2.—*Results with a composite water after a second treatment, using a commercial calcined magnesite*

Number of times the MgO was used in this series (A)	Fluoride (F) content before any treatment (B)	Fluoride of the composite[1] sample after one treatment with 4-times-used calcined magnesite (table 1) (C)	Residual fluoride after a second treatment (with a fresh portion of the magnesite) (D)	Fluoride removed by first treatment (B−C) (E)	Fluoride removed by second treatment (C−D) (F)	Total fluoride removed by the two treatments (E+F) (G)
	Parts per million					
1	5	2.9	0.7	2.1	2.2	4.3
2			.6		2.3	4.4
3			1.1		1.8	3.9
4			1.0		1.9	4.0
5			.8		2.1	4.2
6			.8		2.1	4.2
7			.9		2.0	4.1
8			1.1		1.8	3.9
9			1.0		1.9	4.0
10			1.2		1.7	3.8
11			1.5		1.4	3.5
Average			1.0		1.9	4.0

[1] This composite represented a mixture of the water from runs 5 to 17 (table 1, column C).

TABLE 3.—*Results with a composite water after a second treatment, using a commercial light magnesium oxide*

Number of times the MgO was used in this series (A)	Fluoride (F) content before any treatment (B)	Fluoride of the composite[1] sample after one treatment with 5-times used light magnesium oxide (table 1) (C)	Residual fluoride after a second treatment (with a fresh portion of the oxide) (D)	Fluoride removed by first treatment (B−C) (E)	Fluoride removed by second treatment (C−D) (F)	Total fluoride removed by the two treatments (E+F) (G)
	Parts per million					
1	5	2.1	0.6	2.9	1.5	4.4
2			.7		1.4	4.3
3			.7		1.4	4.3
4			.6		1.5	4.4
5			.7		1.4	4.3
6			.7		1.4	4.3
7			.6		1.5	4.4
8			.7		1.4	4.3
9			.6		1.5	4.4
10			.6		1.5	4.4
11			.9		1.3	4.1
Average			.7		1.4	4.3

[1] This composite represented a mixture of the water from runs 6 to 17 (table 1, column E).

TABLE 4.—*Showing the residual fluoride-removing power of the used calcined magnesites*

Number of times the 11-times-used calcined magnesite (table 2) was used in this series	Fluoride (F) content before any treatment	Fluoride content of the mixed water obtained from 25 subsequent runs with the 17-times-used calcined magnesite (table 1)	Residual fluoride in (C) after treatment with the 11-times-used calcined magnesite (table 2)	Average fluoride first removed by the 17-times-used calcined magnesite in 25 subsequent runs (B−C)	Fluoride subsequently removed by the 11-times-used (table 2) calcined magnesite (C−D)	Total fluoride removed in two treatments (by the 17-times-used and 11-times-used) calcined magnesites (E+F)
(A)	(B)	(C)	(D)	(E)	(F)	(G)
	Parts per million					
1	5	4.2	2.3	0.8	1.9	2.7
2			2.2		2.0	2.8
3			2.3		1.9	2.7
4			2.2		2.0	2.8
5			2.7		1.5	2.3
6			3.1		1.1	1.9
7			2.8		1.4	2.2
8			3.1		1.1	1.9
9			3.2		1.0	1.8
10			3.0		1.2	2.0
Average			2.7		1.5	2.3

TABLE 5.—*Showing the residual fluoride-removing power of the used light magnesium oxides*

Number of times the 11-times-used light magnesium oxide (table 3) was used in this series	Fluoride (F) content before any treatment	Fluoride content of the mixed water obtained from 25 subsequent runs with the 17-times-used light magnesium oxide (table 1)	Residual fluoride in (C) after treatment with the 11-times used light magnesium oxide (table 3)	Average fluoride first removed by the 17-times-used light magnesium oxide in 25 subsequent runs (B−C)	Fluoride subsequently removed by the 11-times-used (table 3) light magnesium oxide (C−D)	Total fluoride removed in two treatments (by the 17-times-used and 11-times-used) light magnesium oxides (E+F)
(A)	(B)	(C)	(D)	(E)	(F)	(G)
	Parts per million					
1	5	3.2	1.1	1.8	2.1	3.9
2			1.1		2.1	3.9
3			1.0		2.2	4.0
4			1.0		2.2	4.0
5			1.1		2.1	3.9
6			1.4		1.8	3.6
7			1.7		1.5	3.3
8			2.0		1.2	3.0
9			1.5		1.7	3.5
10						
11			1.0		2.2	4.0
Average			1.3		1.9	3.7

Since the cost of treatment would probably vary with different localities, with the varying cost of the magnesium oxide, with the varying composition of the dissolved solids in the water, the cost of possible methods of reactivation, or the reduction of the original cost by utilizing the magnesium oxide for other purposes after its use for fluoride removal, we can consider this question at present only partially [6] and in general terms. We may, however, consider particularly the important factor of the efficiency of a given specimen of the magnesium oxide as a fluoride-remover. If we take the gallon and pound as the units for our calculations, we may summarize the above results as follows:

Table 1 shows that, in the case of the calcined magnesite, the fluoride removal in the first three runs was 4.3 to 4.8 parts per million, yielding water with residual fluoride of less than 1 p. p. m. (0.2 to 0.7); but if the waters were mixed, that from the fourth run could be added and the composite sample would still show less than 1 p. p. m. (0.8). In the case of the light magnesium oxide, the first four runs yielded water with residual fluoride of less than 1 p. p. m. (0.2 to 0.9); but if the waters were mixed, those from the fifth, sixth, and seventh runs could be added and the composite sample would still show less than 1 p. p. m. (0.9). The fifth to the seventeenth runs, in the case of the calcined magnesite, yielded a composite sample that showed a fluoride removal of about 2.1 p. p. m.; while in the case of the light magnesium oxide, the sixth to the seventeenth runs yielded a composite water that showed a fluoride removal of about 2.9 p. p. m. Using a composite water which had received one treatment, the residual fluoride in the mixture obtained from 11 runs with a second portion of magnesium oxide (tables 2 and 3) was reduced to about 1 p. p. m. or less (about 1 in the case of the calcined magnesite and 0.7 in the case of the light magnesium oxide).

The fluoride-removing power of the magnesium oxides, however, was not yet completely exhausted. In the subsequent 25 runs with the magnesium oxide that had already been used in 17 runs (table 1), there was a further removal of fluoride, corresponding to an average of about 0.8 p. p. m. in the case of the calcined magnesite and to about 1.8 p. p. m. in the case of the light magnesium oxide; and when about two-fifths of each of these waters were then treated a second time with magnesium oxide that had already been used in 11 runs (tables 2 and 3), there was a further average reduction of about 1.5 p. p. m., or a total fluoride removal of about 2.3 p. p. m. in the case of the calcined magnesite (table 4). In the case of the light magnesium oxide, the corresponding figures were about 1.9 and 3.7 p. p. m., respectively (table 5).

[6] The treatment with magnesium oxide leaves a slight caustic alkalinity which would have to be neutralized (with carbon dioxide). This, therefore, is another item of expense to be considered.

If we do not consider the indicated residual fluoride-removing power of the used magnesium oxides (tables 4 and 5) and limit our calculations to the quantities of water in which the fluoride was reduced from 5 to about 1 p. p. m. in not exceeding two treatments (tables 1, 2, and 3), the above results show that, when the operation was carried out on a basis of 1 ounce of the magnesium oxide per gallon of water in the treatment container, the two treatments (using a total of 2 ounces per gallon) were effective in reducing the fluoride to not exceeding about 1 p. p. m. for a quantity of water corresponding to about 11 gallons [7] when using the calcined magnesite and to about 12 gallons when using the light magnesium oxide. On this basis, 1 pound of the calcined magnesite would serve to treat about 88 gallons and 1 pound of the light magnesium oxide would be sufficient to treat about 96 gallons of such water.

It is to be noted, however, that the above treatment has been applied to a fluoride concentration considerably higher than is ordinarily found in endemic areas (*4*). As indicated in tables 2 and 3, the cost of treatment would be lower when the fluoride concentration is less than 5 p. p. m. (a larger number of runs with the same magnesium oxide yielding water with a residual fluoride of not exceeding about 1 p. p. m. when starting with 2.1 or 2.9 instead of 5 p. p. m.).

As has been stated, the magnesium oxides used were utilized in the condition as sold for their ordinary uses. This eliminates an increase of cost on account of preparatory treatment. Besides using a chemical which is comparatively inexpensive to start with, it is believed that, in the case of the calcined magnesite particularly, since it is used extensively in building operations and for various other purposes, there is opportunity for realizing a salvage value for the material after its use as a fluoride-remover for drinking water, and thus indirectly reducing the cost of treatment. The comparatively small amount of fluoride [8] or other constitutents of the water that will have been

[7] These figures were derived as follows: In the case of the calcined magnesite, the mixed water from the first 4 runs (table 1, column C) did not require a second treatment; but since only ¾ of the column of water was siphoned off after each run, only the water of the first run may be considered as representing a whole gallon of treated water, while the water obtained from the 3 subsequent runs corresponded to only 2.25 gallons (0.75 × 3) of treated water. Similarly, the water from the first run of table 2 corresponded to a whole gallon, but the contribution of the subsequent 10 runs corresponded to only 7.5 gallons (0.75 × 10). The total quantity of water with a residual fluoride of not exceeding about 1 p. p. m., therefore, corresponded to 11.75 gallons (1 + 2.25 + 1 + 7.5), or about 11 gallons in round numbers.

Similarly in the case of the light magnesium oxide, the contribution of sufficiently treated water from the first 5 runs of table 1 represented 4 gallons (1 + 3), and the water from the second treatment (table 3) represented 8.5 gallons (1 + 7.5). The total in this case, therefore, corresponded to 12.5 gallons (4 + 8.5), or about 12 gallons in round numbers.

[8] In this connection, it may be interesting to note that Nagai and Takahara (*5*) have recently proposed the addition of small amounts of fluoride to portland cement raw mixtures for promoting combination. Likewise, Shaw and Shaw (*6*) have recommended as beneficial the presence of a small proportion of fluoride as magnesium silico-fluoride in the preparation of concretes, mortars, and plaster from medium or lightly burned dolomite.

adsorbed by or removed with the magnesium oxide probably would not interfere with its subsequent utilization.

SUMMARY

Results obtained indicate that fluoride can be removed from water with the aid of tricalcium phosphate, magnesium oxide, or magnesium hydroxide. Since the question of cost is very important, and since, at present, magnesium oxide appears to be the least expensive, experiments have been conducted mostly with this substance. Different grades of commercial magnesium oxide showed different degrees of fluoride-removing power. Although a commercial light magnesium oxide was found more efficient as a fluoride-remover, per given weight, than a commercial calcined magnesite, its greater efficiency was not proportional to its present higher cost. From the point of view of economical operation, much work remains to be done. It is pointed out, however, that in the case of the calcined magnesite particularly, since it is used extensively in building operations and for various other purposes, it may be possible to utilize the material after its availability for fluoride removal has been exhausted and thus indirectly reduce the cost of treatment. Such utilization would add another advantage to the advantages of its commercial availability in large quantities and comparatively low initial cost.

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NOTE ON A NEW OCULAR MICROMETER FOR USE IN DUST COUNTING

By Richard T. Page, *Assistant Public Health Engineer, United States Public Health Service*

The technique most commonly employed for determining the dust concentration in impinger samples of air is practically a duplication of the technique used by Whipple (*1*) for determining plankton concentration in drinking water. A portion of the sample is placed in a covered glass counting cell which is placed upon the stage of a microscope. Then the numbers of particles in several representative fields are counted. The counting cell must have a transparent base and cover, and the depth of the liquid being examined must be exactly established. A cell depth of 1 millimeter has been found convenient; consequently, the rectangular Sedgwick-Rafter cell, having a capacity of 1 cubic centimeter and a depth of 1 millimeter, is commonly used. In counting either dust particles or plankton, the whole depth of the cell is examined. This prohibits the use of a ruled counting cell and requires the use of an ocular micrometer that defines the area of the field.

The standard micrometer for this work has been the one designed by Whipple. It consists of a ruled square upon a thin glass disk which is placed upon the diaphragm of the ocular. The side of the large square on the Whipple micrometer is 7 mm. It is used with a combination of objective, ocular, and tube length of the microscope such that the area on the stage covered by the ocular micrometer is exactly 1 square millimeter. Consequently, with a cell 1 millimeter deep, the volume within the outlines of the ruled square is 1 cubic millimeter. For convenience in determining the size of the plankton organisms found, Whipple further subdivided the micrometer as shown in Figure 1–A. The large square is divided into 100 medium-sized squares and 1 of these in turn is further subdivided into 25 very small squares.

In making plankton counts, it is customary to count the whole field covered by the Whipple micrometer. In making dust counts (*2*), on the other hand, it is the practice to count the dust in only one-quarter of each ruled field. Only one of the three quadrants which do not contain the finely subdivided square is counted; the remaining three quadrants are unused and therefore unnecessary. To facilitate the counting of dust samples, a micrometer eyepiece was made according to the design shown in Figure 1–B. The ruled grid corresponding to one quadrant of the Whipple grid is located in the center of the visible field. The grid consists of an etched square 3.5 mm side measurement, divided into 25 small squares. Results

obtained with this micrometer are identical with results obtained when counting one-fourth of the Whipple field. Both micrometer eyepieces are being used for dust counting by the Division of Industrial Hygiene of the United States Public Health Service.

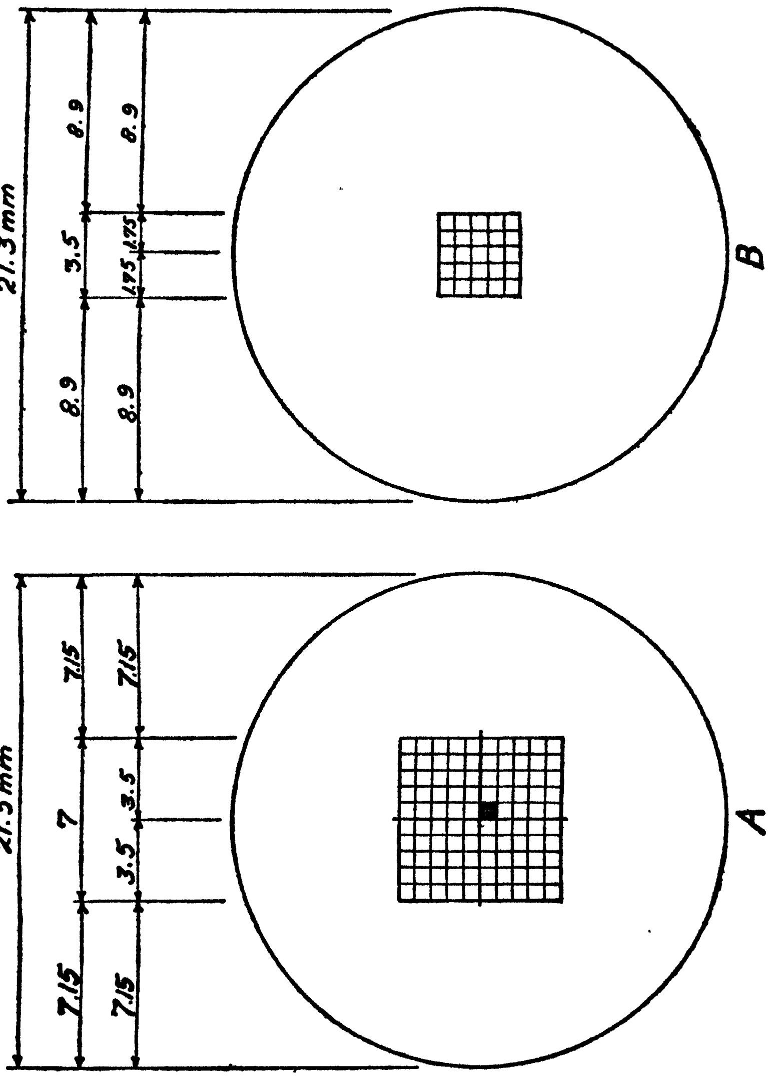

FIGURE 1.—(A) Whipple ocular micrometer. (B) Modified ocular micrometer.

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DEATHS DURING WEEK ENDED AUGUST 28, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Aug. 28, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	7,140	7,345
Average for 3 prior years	7,027	
Total deaths, first 34 weeks of year	302,006	302,933
Deaths under 1 year of age	511	509
Average for 3 prior years	482	
Deaths under 1 year of age, first 34 weeks of year	19,360	19,075
Data from industrial insurance companies:		
Policies in force	69,724,311	68,313,576
Number of death claims	10,801	11,009
Death claims per 1,000 policies in force, annual rate	8.1	8.4
Death claims per 1,000 policies, first 34 weeks of year, annual rate	10.2	10.3

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 4, 1937, and Sept. 5, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 4, 1937	Week ended Sept. 5, 1936	Week ended Sept 4, 1937	Week ended Sept. 5, 1936	Week ended Sept. 4, 1937	Week ended Sept. 5, 1936	Week ended Sept. 4, 1937	Week ended Sept. 5, 1936
New England States:								
Maine	1	1			2	8	0	0
New Hampshire	1						0	0
Vermont						2	0	0
Massachusetts	3	3			14	21	0	1
Rhode Island					1		0	0
Connecticut	3		1	3	1	6	0	0
Middle Atlantic States:								
New York	11	15		[1] 4	78	66	3	5
New Jersey	2	3		4	20	8	1	3
Pennsylvania	12	27			131	57	4	2
East North Central States:								
Ohio	8	4		2	38	5	1	0
Indiana	4	6	14	7	13	10	1	2
Illinois	15	20	6	3	44	2	3	3
Michigan	9	9	3		27	13	0	8
Wisconsin	2	4	10	2	33	8	2	1
West North Central States:								
Minnesota	1	5	1		6	4	1	1
Iowa	2	5			1	3	1	0
Missouri	8	13	83	8	10	2	1	1
North Dakota	1	2			2		0	0
South Dakota						10	1	0
Nebraska	1	6			2	1	0	0
Kansas	2	7		1	2	2	1	0
South Atlantic States:								
Delaware							0	0
Maryland [2] [3]	6		2	2	6	13	0	0
District of Columbia	5	9		1	4	1	1	0
Virginia [4]	23	15			13	8	2	3
West Virginia	11	6	16	5	9	1	0	0
North Carolina [3] [4]	44	38		2	24	7	2	0
South Carolina [3]	3	4	50	50	10	2	0	1
Georgia [3]	14	11					0	1
Florida [3]	12	8					1	1
East South Central States:								
Kentucky	19	12	1	5	18	17	4	2
Tennessee [3]	6	17	6	6	31	5	0	7
Alabama [3]	13	21	5	6	3		1	0
Mississippi [3]	7	19					0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 4, 1937, and Sept. 5, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 4, 1937	Week ended Sept. 5, 1936	Week ended Sept. 4, 1937	Week ended Sept. 5, 1936	Week ended Sept. 4, 1937	Week ended Sept. 5, 1936	Week ended Sept. 4, 1937	Week ended Sept. 5, 1936
West South Central States:								
Arkansas	14	9	4	2	3		1	1
Louisiana	7	10	7	15			1	1
Oklahoma [1]	4	8	17	8		18	2	0
Texas [3]	30	28	76	31	8	8	2	2
Mountain States:								
Montana	1	1		4	7		0	0
Idaho	1	1				1	0	0
Wyoming						1	0	0
Colorado [4]	2	5			13	3	0	5
New Mexico	2	2		1	5	3	1	2
Arizona		2	7	14		1	0	1
Utah [3]	5		5		12	1	0	2
Pacific States:								
Washington		1		2	21	4	1	1
Oregon			14	10	4	4	0	0
California [3]	14	30	11	13	17	18	3	3
Total	335	387	339	211	633	339	42	55
First 35 weeks of year	14,417	15,489	275,124	140,518	242,553	268,099	4,292	5,993

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 4, 1937	Week ended Sept. 5, 1936	Week ended Sept. 4, 1937	Week ended Sept. 5, 1936	Week ended Sept. 4, 1937	Week ended Sept. 5, 1936	Week ended Sept. 4, 1937	Week ended Sept. 5, 1936
New England States:								
Maine	19	1	4	4	0	0	1	0
New Hampshire	4	0		3	0	0	0	0
Vermont	0	0	1	3	0	0	0	0
Massachusetts	44	1	12	38	0	0	4	5
Rhode Island	3	0	3	6	0	0	0	6
Connecticut	10	1	4	7	0	0	3	2
Middle Atlantic States:								
New York	52	20	72	88	0	0	28	30
New Jersey	10	1	13	11	0	0	5	27
Pennsylvania	19	5	66	76	0	0	39	38
East North Central States:								
Ohio	31	2	28	52	0	0	43	15
Indiana	11	1	28	14	0	0	8	8
Illinois	106	30	77	84	1	3	22	25
Michigan	34	5	96	40	0	0	17	10
Wisconsin	23	1	37	46	1	1	3	2
West North Central States:								
Minnesota	18	0	14	12	2	0	0	2
Iowa	16	3	13	16	4	4	5	1
Missouri	25	2	24	13	1	0	36	47
North Dakota	8	0	4	5	1	2	3	2
South Dakota	5	2	6	13	3	0	2	1
Nebraska	19	1	5	3	0	0	1	0
Kansas	14	0	23	17	0	0	5	11
South Atlantic States:								
Delaware	0	0			0	0	0	1
Maryland [2, 3]	6	1	11	15	0	0	17	11
District of Columbia	4	0	2	6	0	0	5	0
Virginia [4]	1	4	6	17	0	0	19	15
West Virginia	4	3	31	12	0	0	17	16
North Carolina [3, 4]	8	1	22	27	0	0	16	25
South Carolina [3]	0	0	2	3	0	0	10	4
Georgia [3]	2	5	9	1	0	0	16	24
Florida [3]	2	2		4	0	0	4	5

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 4, 1937, and Sept. 5, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 4, 1937	Week ended Sept. 5, 1936	Week ended Sept. 4, 1937	Week ended Sept. 5, 1936	Week ended Sept. 4, 1937	Week ended Sept 5, 1936	Week ended Sept. 4, 1937	Week ended Sept. 5, 1936
East South Central States:								
Kentucky	8	4	29	27	0	0	34	52
Tennessee [3]	2	22	10	21	0	0	13	25
Alabama [3]	5	5	10	13	2	0	12	12
Mississippi [3]	10	18	5	3	0	0	11	16
West South Central States:								
Arkansas	6	1	10	3	0	0	13	20
Louisiana	4	3	5	3	0	0	19	33
Oklahoma [5]	9	0	14	8	0	0	18	26
Texas [3]	36	1	24	24	1	0	65	27
Mountain States:								
Montana	3	1	10	16	11	3	2	7
Idaho	1	0	4	4	0	0	0	5
Wyoming	0	0	7	9	0	5	1	0
Colorado [4]	20	2	15	6	2	0	4	6
New Mexico	0	2	--------	5	0	0	5	20
Arizona	1	0	--------	1	0	0	3	0
Utah [3]	2	0	47	2	0	0	1	1
Pacific States:								
Washington	1	7	14	9	8	8	1	2
Oregon	2	0	5	11	1	2	8	5
California [3]	38	25	56	64	1	0	17	16
Total	641	183	878	865	34	28	556	606
First 35 weeks of year	4,695	1,801	166.580	180,424	8,080	6,004	9,374	8,500

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Sept. 4, 1937, 83 cases, as follows: Maryland 1, North Carolina, 3; South Carolina, 2; Georgia, 32; Florida, 6; Tennessee, 1; Alabama, 16; Texas, 21; California, 1.
[4] Rocky Mountain spotted fever, week ended Sept. 4, 1937, 6 cases, as follows· Virginia, 1; North Carolina, 4; Colorado, 1.
[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June 1937										
Puerto Rico	2	36	65	748	134	--------	1	1	0	57
July 1937										
Arizona	1	11	46	1	28	--------	5	20	0	16
Hawaii Territory	--------	14	5	--------	262	--------	0	--------	0	0
Massachusetts	5	26	--------	3	672	--------	30	262	0	14
Puerto Rico	--------	44	32	944	64	--------	0	--------	0	35
Tennessee	10	23	23	255	317	44	53	40	1	194
Washington	5	9	6	--------	157	--------	1	46	9	16
August 1937										
District of Columbia	11	30	--------	--------	18	--------	8	9	0	15
Nebraska	1	1	--------	--------	7	--------	55	8	--------	2

Summary of Monthly Reports from States—Continued

June 1937	Cases
Puerto Rico:	
Chickenpox	23
Dysentery	16
Filariasis	1
Leprosy	1
Puerperal septicemia	2
Tetanus	6
Trachoma	1
Whooping cough	89
July 1937	
Anthrax:	
Massachusetts	1
Chickenpox:	
Arizona	5
Hawaiian Territory	40
Massachusetts	439
Puerto Rico	22
Tennessee	9
Washington	124
Dysentery:	
Arizona	75
Massachusetts (bacillary)	3
Puerto Rico	13
Tennessee (amoebic)	8
Tennessee (bacillary)	154
Encephalitis, epidemic or lethargic:	
Massachusetts	2
Tennessee	1
Washington	1
Filariasis:	
Puerto Rico	14
German measles:	
Arizona	5
Massachusetts	60
Tennessee	10
Washington	10
Hookworm disease:	
Hawaii Territory	1
Tennessee	6
Impetigo contagiosa:	
Hawaii Territory	15
Tennessee	6

July 1937	Cases
Jaundice, infectious:	
Hawaii Territory	2
Lead poisoning:	
Massachusetts	2
Leprosy:	
Hawaii Territory	6
Puerto Rico	3
Mumps:	
Arizona	20
Hawaii Territory	20
Massachusetts	171
Puerto Rico	1
Tennessee	62
Washington	155
Ophthalmia neonatorum:	
Massachusetts	83
Puerto Rico	1
Tennessee	7
Paratyphoid fever:	
Hawaii Territory	1
Massachusetts	28
Tennessee	12
Puerperal septicemia:	
Puerto Rico	8
Tennessee	3
Rabies in animals:	
Massachusetts	29
Washington	19
Rocky Mountain spotted fever:	
Tennessee	2
Septic sore throat:	
Massachusetts	10
Tennessee	10
Washington	1
Tetanus:	
Hawaii Territory	3
Massachusetts	4
Puerto Rico	11
Tennessee	3
Tetanus, infantile:	
Puerto Rico	1

July 1937	Cases
Trachoma:	
Arizona	29
Massachusetts	1
Tennessee	1
Trichinosis:	
Massachusetts	1
Tularaemia:	
Tennessee	2
Typhus fever:	
Hawaii Territory	3
Tennessee	3
Undulant fever:	
Arizona	8
Massachusetts	4
Tennessee	1
Vincent's infection:	
Tennessee	5
Whooping cough.	
Arizona	51
Hawaii Territory	5
Massachusetts	789
Puerto Rico	23
Tennessee	455
Washington	300
August 1937	
Anthrax:	
Nebraska	1
Chicken pox	
District of Columbia	7
Nebraska	9
Encephalitis, epidemic or lethargic	
Nebraska	2
Mumps	
Nebraska	5
Rocky Mountain spotted fever:	
District of Columbia	1
Septic sore throat.	
Nebraska	8
Whooping cough:	
District of Columbia	36
Nebraska	42

PLAGUE INFECTION IN WASATCH COUNTY, UTAH, AND MADISON COUNTY, MONT.

Under date of September 2, 1937, plague infection was reported to have been demonstrated, by animal inoculation, in tissue from one ground squirrel (*Citellus armatus*) shot August 19 west of Strawberry Reservoir, 21 miles southeast of Heber, Wasatch County, Utah, and from 2 ground squirrels (*Citellus elegans*), separately, taken on August 20 and 23, 4½ and 5 miles southeast of Cameron, Madison County, Mont.

CASE OF SMALLPOX (VARIOLOID) ON VESSEL AT HONOLULU, T. H.

Report has been received that a case of smallpox (varioloid) occurred in a steerage passenger on the British S. S. *Empress of Asia*, which arrived at Honolulu on September 5. The case was recognized by the ship's surgeon 2 days before the vessel arrived. The patient was taken to the ship's hospital and all third-class passengers and crew contacts were vaccinated. Those failing to show an immune reaction were detained at quarantine, while those showing such reaction were released.

WEEKLY REPORTS FROM CITIES

City reports for week ended Aug. 28, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	119	54	13	187	278	269	3	353	109	1,019	-------
Current week [1]	52	23	8	249	270	206	1	331	51	1,088	-------
Maine:											
Portland	0	------	0	0	0	1	0	1	1	4	16
New Hampshire:											
Concord	0	------	0	1	0	0	0	0	0	0	4
Nashua	0	------	-------	0	-------	0	0	-------	0	0	7
Vermont:											
Barre	0	------	0	0	1	0	0	0	0	0	4
Burlington	0	------	0	0	0	0	0	0	1	0	7
Rutland	0	------	0	0	0	0	0	0	0	0	6
Massachusetts:											
Boston	0	------	0	3	5	9	0	12	1	28	176
Fall River	0	------	0	1	1	1	0	0	0	22	24
Springfield	0	------	0	0	0	0	0	0	1	14	28
Worcester	0	------	0	0	1	0	0	3	0	3	50
Rhode Island:											
Pawtucket	0	------	0	0	0	0	0	0	0	0	9
Providence	0	------	0	5	2	6	0	2	0	11	51
Connecticut:											
Bridgeport	0	------	0	0	1	0	0	0	0	0	29
Hartford	0	------	0	0	2	0	0	0	0	6	33
New Haven	0	------	0	6	2	1	0	0	0	3	40
New York:											
Buffalo	0	------	1	2	4	1	0	2	0	15	119
New York	8	2	2	85	64	12	0	69	8	-------	1,186
Rochester	0	1	0	2	5	1	0	2	0	9	62
Syracuse	0	------	0	0	2	1	0	0	0	15	40
New Jersey:											
Camden	0	------	0	0	0	0	0	0	1	1	38
Newark	0	1	0	3	1	2	0	3	0	13	76
Trenton	0	------	0	5	1	2	0	1	1	1	42
Pennsylvania:											
Philadelphia	2	------	0	3	10	8	0	26	7	28	446
Pittsburgh	1	------	0	17	8	5	0	9	3	44	127
Reading	0	------	0	1	1	1	0	0	0	4	21
Scranton	0	------	-------	0	-------	0	0	-------	0	6	-------
Ohio:											
Cincinnati	0	------	1	0	7	3	0	7	2	22	113
Cleveland	0	2	0	18	8	13	0	12	1	51	175
Columbus	0	------	0	1	1	1	0	2	0	11	75
Toledo	0	------	0	1	3	3	0	4	7	14	74
Indiana:											
Anderson	0	------	0	1	0	0	0	0	0	6	6
Fort Wayne	0	------	0	0	1	0	0	1	0	3	30
Indianapolis	0	------	0	2	3	0	0	5	0	17	89
Muncie	0	------	0	1	0	1	0	1	0	0	7
South Bend	0	------	0	0	2	2	0	2	0	0	18
Terre Haute	0	------	0	0	0	0	0	0	0	0	19
Illinois:											
Alton	0	------	0	2	0	0	0	0	0	1	11
Chicago	11	2	1	39	11	18	0	39	1	73	542
Elgin	0	------	0	0	1	0	0	0	0	0	7
Moline	0	------	0	0	0	0	0	0	0	6	12
Springfield	0	------	0	0	3	0	0	0	0	1	19
Michigan:											
Detroit	2	3	0	12	3	20	0	14	4	108	234
Flint	0	------	0	0	1	3	0	1	2	2	29
Grand Rapids	0	------	0	7	1	2	0	0	0	8	26

[1] Figures for St. Joseph, Raleigh, Atlanta, and Great Falls estimated; reports not received.

City reports for week ended Aug. 28, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Wisconsin:											
Kenosha	0		0	1	0	0	0	0	0	5	7
Madison	0		0	0	0	1	0	0	0	7	14
Milwaukee	0		0	11	0	1	0	2	0	50	74
Racine	0		0	3	0	2	0	0	0	1	12
Superior	0		0	3	0	0	0	0	0	2	5
Minnesota:											
Duluth	0		0	0	2	1	0	2	0	10	18
Minneapolis	0		0	1	1	11	0	2	0	12	84
St. Paul	0		0	1	4	1	0	2	0	14	43
Iowa:											
Cedar Rapids	0			0		1	0		0	0	
Davenport	0			0		0	0		0	0	
Des Moines	0			0	2	2	0		0	0	20
Sioux City	0			0		1	0		0	4	
Waterloo	0			0		0	0		0	0	
Missouri:											
Kansas City	0		0	2	2	6	0	2	1	1	81
St. Joseph											
St. Louis	1		0	13	1	12	1	8	2	8	216
North Dakota:											
Fargo	0		0	0	0	0	0	0	0	27	9
Grand Forks	0			0		0	0		0	2	
Minot	0		0	0	0	1	0	0	0	0	4
South Dakota:											
Aberdeen	0			0		0	0		0	0	
Sioux Falls	0		0	0	0	0	0	0	0	0	7
Nebraska:											
Omaha	0		0	2	1	3	0	1	0	1	41
Kansas:											
Lawrence	0		0	0	0	0	0	0	0	0	3
Topeka	0		0	0	1	1	0	0	1	11	17
Wichita	0		0	0	1	1	0	1	0	11	22
Delaware:											
Wilmington	0		0	0	1	0	0	2	0	1	27
Maryland:											
Baltimore	2	1	1	1	11	0	0	5	1	82	196
Cumberland	0		0	0	0	0	0	1	0	3	13
Frederick	0		0	0	0	0	0	0	0	0	7
District of Columbia:											
Washington	4		0	3	15	1	0	9	2	8	144
Virginia:											
Lynchburg	0		0	0	0	0	0	0	0	2	9
Norfolk	2		0	1	0	1	0	1	0	4	20
Richmond	1		0	1	2	0	0	5	0	0	45
Roanoke	0		0	0	1	0	0	0	0	0	11
West Virginia:											
Charleston	0	1	0	0	1	0	0	0	0	2	37
Huntington	1			0		1	0		0	0	
Wheeling	0		0	0	0	1	0	1	0	10	12
North Carolina:											
Gastonia	0			0		0	0		0	0	
Raleigh											
Wilmington	0		0	0	0	0	0	0	0	10	9
Winston-Salem	0		0	1	1	1	0	0	0	10	9
South Carolina:											
Charleston	0		0	0	2	0	0	0	1	0	22
Florence	0		0	0	0	1	0	0	0	0	17
Greenville	1		0	0	0	0	0	0	0	1	19
Georgia:											
Atlanta											
Brunswick	0		0	0	0	0	0	0	0	0	11
Savannah	0		0	0	0	0	0	0	1	0	19
Florida:											
Miami	0	1	0	8	1	0	0	1	0	0	24
Tampa	0		0	1	3	0	0	1	0	4	23
Kentucky:											
Covington	0		0	0	1	0	0	0	0	7	19
Lexington	0		0	0	0	0	0	0	0	5	24
Louisville	1		0	4	3	11	0	5	0	24	86

City reports for week ended Aug. 28, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Tennessee:											
Knoxville	1	1	0	0	0	0	0	0	2	0	27
Memphis	0	------	0	4	6	8	0	3	0	17	57
Nashville	0	------	0	0	2	1	0	0	0	7	83
Alabama:											
Birmingham	2	2	0	0	0	1	0	2	0	6	57
Mobile	0	------	1	0	1	0	0	1	0	0	25
Montgomery	1	------	------	0	------	0	0	------	0	1	------
Arkansas:											
Fort Smith	1	------	------	0	------	0	0	------	0	0	------
Little Rock	0	------	0	0	0	0	0	3	0	0	5
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	0	0	0	2
New Orleans	3	2	1	0	7	0	0	9	0	18	140
Shreveport	0	------	0	0	0	1	0	3	2	0	22
Oklahoma:											
Oklahoma City	0	------	0	0	8	2	0	2	8	0	39
Tulsa	1	------	------	2	------	0	0	------	1	2	------
Texas:											
Dallas	0	------	0	1	2	0	0	7	1	9	47
Fort Worth	0	------	0	0	1	0	0	0	1	2	17
Galveston	0	------	0	0	0	1	0	1	1	0	16
Houston	3	------	0	0	7	0	0	6	0	0	80
San Antonio	0	------	0	0	3	0	0	6	1	1	66
Montana:											
Billings	0	------	0	0	0	0	0	0	0	1	4
Great Falls	------	------	------	------	------	------	------	------	------	------	------
Helena	0	------	0	0	0	0	0	0	0	0	2
Missoula	0	------	0	0	0	0	0	0	0	0	3
Idaho:											
Boise	0	------	0	1	0	0	0	0	0	1	5
Colorado:											
Colorado Springs	0	------	0	0	0	0	0	1	1	1	18
Denver	1	------	0	15	6	3	0	0	1	21	100
Pueblo	0	------	0	1	0	0	0	0	1	0	10
New Mexico:											
Albuquerque	1	------	0	0	1	0	0	3	0	4	21
Utah:											
Salt Lake City	0	------	0	8	0	4	0	1	0	1	37
Washington:											
Seattle	0	------	0	3	2	0	0	2	1	15	88
Spokane	0	------	0	1	1	1	0	0	0	3	21
Tacoma	0	------	0	0	3	2	0	0	0	7	33
Oregon:											
Portland	3	------	0	0	8	4	0	2	1	2	68
Salem	0	------	------	0	------	0	0	------	0	0	------
California:											
Los Angeles	5	4	0	5	9	13	0	10	0	57	298
Sacramento	0	------	0	0	3	0	0	1	1	17	31
San Francisco	0	------	0	0	5	0	0	[illegible]	0	86	151

City reports for week ended Aug. 28, 1937—Continued

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Vermont:			
Burlington	0	0	1
Massachusetts:			
Boston	0	0	25
Springfield	0	0	1
Worcester	0	1	0
Connecticut:			
Hartford	0	0	2
New York:			
Buffalo	1	0	9
New York	5	3	27
New Jersey:			
Newark	0	0	2
Pennsylvania:			
Philadelphia	0	0	5
Ohio:			
Cincinnati	0	0	9
Cleveland	1	0	8
Columbus	1	0	1
Toledo	0	0	2
Indiana:			
Fort Wayne	0	0	1
Muncie	0	0	2
South Bend	0	0	1
Illinois:			
Chicago	2	0	30
Michigan:			
Detroit	0	0	14
Grand Rapids	0	0	1
Wisconsin:			
Milwaukee	0	0	7
Minnesota:			
Minneapolis	1	0	6
Iowa:			
Des Moines	0	0	2
Sioux City	1	0	0
Missouri:			
Kansas City	0	0	10
St. Louis	0	0	6
Nebraska:			
Omaha	0	0	17
Kansas:			
Wichita	0	0	1
Maryland:			
Baltimore	0	0	5
District of Columbia:			
Washington	5	1	3
Virginia:			
Richmond	0	1	0
West Virginia:			
Charleston	0	0	1
Tennessee:			
Memphis	0	0	1
Alabama:			
Mobile	0	0	2
Arkansas:			
Little Rock	0	0	1
Louisiana:			
New Orleans	1	0	1
Texas:			
Dallas	0	0	1
Fort Worth	0	0	2
Colorado:			
Denver	1	0	1
Utah:			
Salt Lake City	0	0	1
California:			
Los Angeles	0	0	6
Sacramento	0	0	1

Dengue.—Cases: Fort Worth, 1.

Encephalitis, epidemic or lethargic.—Cases: Toledo, 2; Indianapolis, 1; St. Paul, 1; St. Louis, 38; Sacramento, 1.

Pellagra.—Cases: Charleston, S. C., 1, Savannah, 1; Louisville, 1; New Orleans, 1; San Francisco, 1.

Typhus fever.—Cases: Charleston, S. C., 3; Savannah, 5, Miami, 1; Memphis, 5, Montgomery, 3; Dallas, 1; Fort Worth, 1.

FOREIGN AND INSULAR

DENMARK

Notifiable diseases—April–June 1937.—During the months of April, May, and June 1937, cases of certain notifiable diseases were reported in Denmark as follows:

Disease	April	May	June	Disease	April	May	June
Cerebrospinal meningitis	4	5	7	Poliomyelitis	3	1	8
Chicken pox	50	20	23	Puerperal fever	16	22	14
Diphtheria	112	106	93	Scabies	1,032	722	738
Epidemic encephalitis	3	2	2	Scarlet fever	649	394	356
Erysipelas	249	176	210	Syphilis	58	60	59
German measles	145	105	68	Tetanus neonatorum	3	3	5
Gonorrhea	785	735	804	Tetanus, traumatic		1	1
Influenza	5,904	4,106	2,970	Typhoid fever	2	1	11
Malaria	3	9	8	Undulant fever (Bact. abort. Bang)	61	56	57
Measles	106	74	71	Weil's disease		3	2
Mumps	1,839	1,136	822	Whooping cough	1,422	948	1,041
Paradysentery	13	26	104				
Paratyphoid fever	7	4	21				

SCOTLAND

Vital statistics—1936.—Following are vital statistics for Scotland for the year 1936:

	Number	Rate per 1,000 population		Number	Rate per 1,000 population
Population	4,966,300		Maternal mortality	494	[1] 5.6
Births	88,928	17.91	Deaths from tuberculosis (all forms)		[2] 74
Deaths	66,749	13.44			
Infant mortality		[1] 82.3			

[1] Per 1,000 births.
[2] Per 100,000 population.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for Aug. 27, 1937, pp. 1191–1205. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued Sept. 24, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

China.—Cholera has been reported in China as follows: Week ended August 21, 1937, 4 cases in Swatow; week ended August 28, 1937, 3 cases in Shanghai.

Plague

Hawaii Territory—Island of Hawaii—Hamakua District—Hamakua Mill Sector.—A rat found August 19, 1937, in Hamakua Mill Sector, Hamakua District, Island of Hawaii, Hawaii Territory, has been proved plague infected.

United States.—A report of plague infection in Montana and Utah appears on page 1321 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

Mexico.—Smallpox has been reported in Mexico for the month of June 1937, as follows: Guadalajara, Jalisco State, 1 case, 1 death; Mexico, D. F., 28 cases, 15 deaths; Queretaro, Queretaro State, 8 cases; San Luis Potosi, San Luis Potosi State, 1 case, 1 death.

Typhus Fever

Mexico.—During the month of June 1937, typhus fever was reported in Mexico as follows: Mexico, D. F., 14 cases, 5 deaths; Pachuca, Hidalgo State, 2 cases; Queretaro, Queretaro State, 2 cases.

Yellow Fever

Brazil—Matto Grosso State—Tres Lagoas.—On July 1, 1937, 1 death from yellow fever was reported in Tres Lagoas, Matto Grosso State, Brazil.

Nigeria.—Yellow fever has been reported in Nigeria as follows: August 21, 1 fatal case in Aba; August 28, 1 fatal case in Sapele.

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg. Gen ROBERT OLESEN, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 52 SEPTEMBER 24, 1937 NO. 39

CULTIVATION OF THE RICKETTSIAE OF ROCKY MOUNTAIN SPOTTED FEVER IN VITRO

By IDA A. BENGTSON, *Senior Bacteriologist, National Institute of Health, United States Public Health Service*

The cultivation of the rickettsiae of Rocky Mountain spotted fever, *Rickettsia rickettsi*, has been reported by Wolbach and Schlesinger (*1*), Pinkerton (*2*), Pinkerton and Hass (*3*), da Cunha (*4*), Breinl (*5*), Bengtson and Dyer (*6*), Bengtson (*7*), and Breinl and Chrobok (*8*). Wolbach and Schlesinger, Pinkerton, and Pinkerton and Hass employed plasma clot tissue cultures; da Cunha, and Bengtson and Dyer, the chorio-allantoic membrane of living chick embryo; and Breinl and Bengtson, the Maitland medium with minced chick embryo in a mixture of a guinea pig or rabbit serum and Tyrode's solution. Breinl and Chrobok have recently reported their results using Maitland medium with guinea pig tunica. Da Cunha cultivated the virus of typhus exanthematicus of Sao Paulo, corresponding with Rocky Mountain spotted fever in this country, in the chorio-allantoic membrane of chick embryo. Hass and Pinkerton (*9*) have recently reported the cultivation of the rickettsiae of boutonneuse fever, a member of the Rocky Mountain spotted fever group, both in plasma clot tissue cultures and in Maitland media.

EXPERIMENTAL

The work here reported is concerned with cultivation of the rickettsiae of Rocky Mountain spotted fever in modified Maitland (*10*) media.

The media were prepared by combining 1 cc of fresh guinea pig serum with 4 cc of Tyrode's solution or Baker's (*11*) solution using (*a*) minced chorio-allantoic membrane of the chick embryo and (*b*) guinea pig tunica vaginalis. Fifty-cc Erlenmeyer flasks were used as containers.

In the early part of the work with the chick embryo membrane as tissue, Tyrode's solution was employed. More numerous rickettsiae were obtained with Baker's solution and this solution was therefore substituted for the Tyrode's solution for the remainder of the study. The solution was prepared according to the formula of Baker for the

cultivation of fibroblasts and epithelial cells.[1] It may be that the solution has the effect of prolonging the viability of the tissue, though this point requires further investigation.

Breinl, who used minced 10-day-old chick embryo tissue with Tyrode's solution in the Maitland media, was not able to demonstrate rickettsiae, though the virus was kept alive through seven passages, as shown by animal inoculations. In the studies here reported, in which Maitland media with chick embryo chorio-allantoic membrane was employed, rickettsiae were demonstrated with great difficulty when Tyrode's solution was employed but usually rather readily after Baker's solution was used. In Breinl's later work in collaboration with Chrobok, in which guinea pig tunica with guinea pig serum and Tyrode's solution were used, rickettsiae were not demonstrated in the early passages and first appeared after the 8th passage in one series and after the 5th passage in another. In our work, using Baker's solution instead of Tyrode's solution, rickettsiae were seen from the beginning.

The strain employed for transplanting was the Bitterroot strain of Rocky Mountain spotted fever which has been carried in guinea pigs for a number of years at the National Institute of Health.

(1) CULTIVATION IN MAITLAND MEDIA IN WHICH CHICK EMBRYO CHORIO-ALLANTOIC MEMBRANE WAS EMPLOYED AS TISSUE

The first generation of growth was obtained on the chorio-allantoic membrane of the living chick embryo. Embryos incubated for 10 to 12 days were inoculated with infected guinea pig spleen, blood, or serum. After 4 or 5 days' further incubation, the chorio-allantoic membrane was removed, minced, and transferred to Erlenmeyer flasks containing the mixtures of guinea pig serum and Tyrode's or Baker's solution. Incubator temperatures of 30° and 37° C. were used, and the periods of incubation varied from 10 to 14 days. Sub-

	Per 100 cc
[1] Witte's peptone	675.00 mg
Cysteine hydrochloride	9.00 mg
Hemin	0.0036 mg.
Insulin	0.09 units.
Thyroxine	0.0009 mg
Glucose	100.00 mg
Serum homologous to the tissue	10.00 cc.
Vitamin A	900.00 to 1,800.00 units.
Vitamin D	About 15.00 to 30.00 units.
Vitamin C (crystalline ascorbic acid)	0.25 mg
Glutathione	1.00 mg.
Phenol red	5.00 mg.
Sodium chloride	720.00 mg.
Potassium chloride	18.00 mg.
Calcium chloride, anhydrous	18.00 mg.
Magnesium chloride, $6H_2O$	9.00 mg.
Sodium dihydrogen phosphate	4.50 mg.
Sodium bicarbonate, anhydrous	100.00 mg.

The writer is indebted to Dr. A. Packchanian for the preparation of the Baker's solution.

sequent transplants were made to flasks containing fresh minced chorio-allantoic membrane from 13- to 14-day-old chick embryos. In making transplants, 0.1 cc of the suspension of tissue was placed in a sterile watch glass, and to this was added a portion of fresh chorio-allantoic membrane. The mixture was minced very fine and allowed to stand at room temperature for 15 to 20 minutes, and then it was distributed among 3 or 4 flasks of medium. The flasks were closed with rubber stoppers and sealed with paraffin. At the time of transplanting, a portion of tissue was prepared for microscopic examination and some of the culture was inoculated into guinea pigs to determine virulence.

Results.—In 6 series of transplants the cultures were maintained through passages varying from 4 to 14. At the time of transplanting, 1 cc of culture was inoculated intraperitoneally into each of 2 guinea pigs. The results of the inoculations are shown in table 1. Positive results were obtained in 81 percent of the animals inoculated. Typical temperature elevations, often with scrotal redness and swelling, followed by death, occurred in 113 of the 172 animals inoculated. The 59 survivals were tested for immunity by injecting 2 cc of guinea pig blood virus. Thirty-five of the survivals were found to be immune, while 14 were nonimmune, indicating lack of growth or not sufficient growth in the particular flasks containing the cultures with which these animals were inoculated.

TABLE 1.—*Summary of 6 experiments on the cultivation of Rickettsia rickettsi*

Experiment no.	Culture no.	Temperature of incubator °C	Number of generations	Number of guinea pigs inoculated	Number of deaths with typical symptoms	Number of survivals	Immune survivals	Nonimmune survivals
1	BR 616 (13)	30	4	8	6	2	1	1
2	BR 616 (15)	30	5	32	25	7	4	3
3	BR 616 (16)	30	7	14	7	7	5	2
4	BR 704	30	6	22	11	11	7	4
5	BR 711 (7b)	30	14	68	46	22	14	[1] 3
6	BR 909	37	4	28	18	10	9	1
	Total			172	113	59	35	14

[1] 5 died from other causes before immunity tests were made.

The temperature curves and the results of the immunity tests in three of the transplants in series BR 711 (7b) are shown in figure 1. As a rule, in all the series of transplants the majority of animals developed symptoms of such severity that death ensued, indicating no diminution in virulence of the strain. In one series of transplants, however, BR 704 (9a), 7 of 10 animals inoculated with cultures in 5 transplants survived and were immune. In the 6th passage the 2 animals inoculated with culture survived after presenting atypical temperature curves and were found to be nonimmune when inoculated with blood virus. In this series apparently the virus had diminished in virulence.

Rickettsiae.—Material to be examined for rickettsiae was spread in a thin layer on slides and stained with Giemsa. A few observations were also made on sections, but these appeared less satisfactory for determination of rickettsiae. In the early transfers, in which Tyrode's solution was employed, the rickettsiae were not numerous, and it was often difficult to find them. In the later transfers, in which Baker's solution was substituted for the Tyrode's solution, rickettsiae were more numerous, and in a few specimens so numerous that they were present in most of the fields. However, they were not always present even when Baker's solution was used.

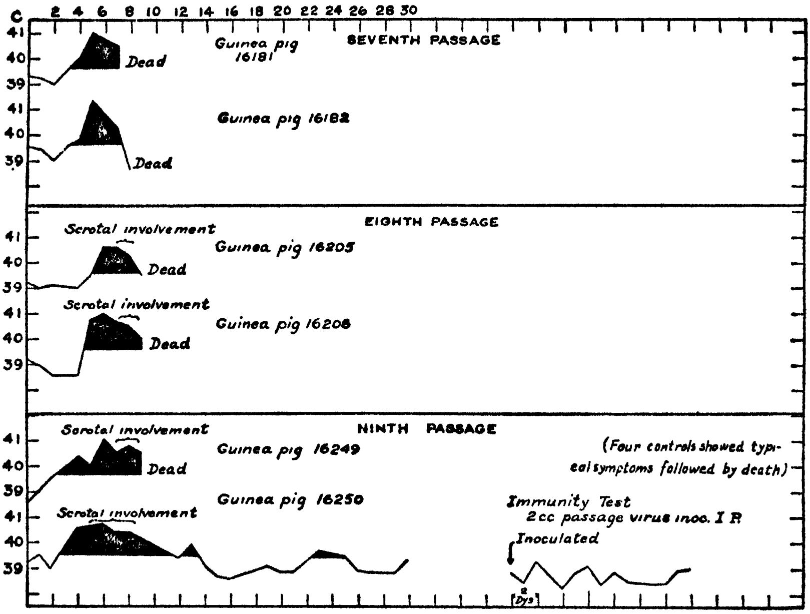
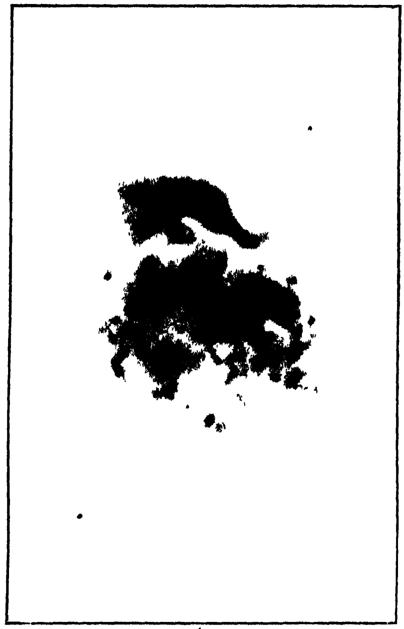


FIGURE 1.—Daily temperature record. B. R. 711 (7b)—Cultures inoculated intraperitoneally.

Contrary to the findings of Pinkerton, who employed plasma clot tissue cultures, the rickettsiae were not found definitely in the nucleus, but they were readily demonstrated in the cytoplasm of certain cells (pls. I and II). The cells involved were principally of two varieties—one a cell with a comparatively large, oval, lightly stained, mottled nucleus with definite nucleolus, representing the ectodermal epithelial cells, and the other a smaller cell with a small dense flattened nucleus, or with small multiple nuclei, which probably corresponds with the endothelial cells lining the capillaries and blood vessels. The organisms within the cells were never very numerous, certainly not packed. Quite frequently rickettsiae were observed in tissues showing no definite cellular structure and also at distances considerably removed from the tissue. There was no evidence however, to indicate

Rickettsiae of Rocky Mountain spotted fever in Maitland medium with chick embryo chorio-allantoic membrane. (× 1900, approx.)

A



B

C

D

Rickettsiae of Rocky Mountain spotted fever in Maitland medium with chick embryo chorio-allantoic membrane. (× 1900, approx.)

Rickettsiae of Rocky Mountain spotted fever in Maitland medium with guinea pig tunica (× 1900, approx.)

Rickettsiae of Rocky Mountain spotted fever in Maitland medium with guinea pig tunica. (X 1900, approx.)

that the rickettsiae had multiplied outside the cells. Efforts to cultivate the organism without tissue were not successful. Also it was not possible to transplant the culture by employing the supernatant fluid of centrifuged cultures.

(2) CULTIVATION IN MAITLAND MEDIA IN WHICH GUINEA PIG TUNICA WAS EMPLOYED AS TISSUE

The technique employed in these cultures was similar to that used with the chick embryo tissue. One guinea pig tunica was divided among four flasks. Usually the parietal tunica was employed, but growth was also obtained with visceral tunica. Cultures were initiated from infected guinea pig tunica, one (BR 1150) on the 7th day of fever and another (BR 1163) on the 3d day of fever. Guinea pig BR 1150 showed scrotal lesions covering an area of about 0.25 cm diameter over each testicle. The infected tunica was used as tissue in the culture medium, and transfers were made at intervals of 7 to 10 days to media containing fresh tunica. One series was continued through 7 transplants and the other through 15. Film preparations were made on slides from material in all flasks, and transplants were made from those showing the most numerous rickettsiae. The first 11 transplants were incubated at 37° C. and the subsequent transplants at both 37° and 32° C.

Rickettsiae were usually found without difficulty (pls. III and IV). In some preparations they were so numerous that several hundred appeared in one field, and most fields contained some. It cannot be said, however, that they approached in numbers the rickettsiae in cultures of endemic typhus. Table 2 indicates the relative numbers of rickettsiae in preparations from the various flasks in one series of cultures. The results at 32° C. are apparently slightly better than those at 37° C.

In contrast to the rickettsiae seen in the chick embryo material, those found in the guinea pig tunica medium were often not so closely associated with the cells. They appeared rather to be scattered throughout the preparation. They were probably more numerous in fields where tissue was present, but they were often found in localities where there was no tissue. As no conclusive evidence was obtained to indicate that multiplication occurred outside the cells, it may be assumed that the cells of the guinea pig tunica were more susceptible to disintegration when grown in the Maitland medium with Baker's solution, with the consequent extrusion of the rickettsiae, than were those of the chick embryo chorio-allantoic membrane. Breinl and Chrobok, on the other hand, illustrate a "viruszelle" in which there is a mass of rickettsiae in the cytoplasm of the cell. As with the chick embryo media no organisms were definitely seen in the nuclei of cells, even when incubated at a temperature of 32° C.

TABLE 2.—*Relative numbers of rickettsiae in preparations from the various flasks*

Passage no.	Tissue	Temperature of incubator	Rickettsiae in flasks
1	Tp	37	1+, 2++, 3+, 4+
2	Tp	37	1+, 2+, 3+++
3	Tp	37	1++, 2—, 3++, 4+++, 5++, 6—, 7—, 8+
4	Tp	37	1++, 2++, 3+++, 4—
5	Tp	37	1+++, 2++, 3+, 4++, 5++, 6+, 7+++, 8+
	Tv	37	9+, 10—, 11++, 12+++, 13++, 14+++, 15—, 16+++
6	Tp	37	1C, 2++, 3—, 4±, 5—, 6++, 7±, 8±
	Tv	37	9++, 10++, 11+++, 12—
7	Tp	37	1+++, 2+, 3±, 4++, 5±, 6+, 7++, 8+++
	Tv	37	9++, 10±, 11—, 12±, 13±, 14±, 15+++, 16±
8	Tp	37	1—, 2+++, 3—, 4—, 5+, 6—, 7—, 8—
9	Tp	37	1+, 2++, 3++, 4++
10	Tp	37	1+, 2++, 3+++, 4—
	Tv	37	5±, 6++, 7+, 8+++
11	Tp	37	1+++, 2++, 3+, 4++
	Tv	37	5++, 6+++, 7+, 8+
12	Tp	37	1±, 2±, 3+++, 4±
	Tv	37	5++, 6++, 7++, 8±
12	Tp	32	1+++, 2+, 3C, 4+++
	Tv	32	5±, 6±, 7++, 8±
13	Tp	37	1+++, 2±, 3±, 4+
	Tv	37	5±, 6++, 7+, 8++, 9±, 10++, 11C, 12+++
13	Tp	32	1C, 2±, 3++, 4+++
	Tv	32	5++, 10++, 11++, 12+
14	Tp	37	1C, 2C, 3+, 4C
	Tv	37	5++, 6±, 7±, 8±
14	Tp	32	1++, 2±, 3++, 4++
	Tv	32	5+++, 10+, 11++, 12±
15	Tp	37	1C, 2C, 3++, 4C
	Tv	37	5+, 6+, 7+, 8+++

Tp = Parietal tunica.
Tv = Visceral tunica.
+++ = Rather numerous rickettsiae, 200–300 to a field, rickettsiae in most fields.
++ = Rickettsiae less numerous, not in all fields.
+ = Rickettsiae found without difficulty.
± = Very few rickettsiae.
— = No rickettsiae seen.
C = Contaminated.

Morphology.—In numerous preparations the rickettsiae were found outside the cells, and it was possible to discern clearly the morphological characteristics of the organism. Contrasted with those of endemic typhus, the rickettsiae of Rocky Mountain spotted fever are rather definitely larger, the ends are more rounded, and they occur more often in pairs and sometimes in short chains resembling a streptococcus or pneumococcus. Diploforms separated by an intervening unstained portion, resembling bipolar organisms, were often present. Except for their small size, they bear a close resemblance morphologically to ordinary bacteria. With Giemsa stain they stain less intensely than bacteria, though apparently somewhat more intensely than the rickettsiae of endemic typhus.

Virulence.—Cultures in the 1st and 11th passages were tested on guinea pigs for virulence (fig. 2). Animals inoculated with 1 cc of the tissue suspension of the 1st passage developed typical symptoms and died. The tissue (about one-fourth tunica) of the 11th passage culture was precipitated by low speed centrifugation for 10 minutes, macerated, and then suspended in salt solution and inoculated into

2 guinea pigs. The supernatant fluid was also inoculated into 2 animals. All developed characteristic symptoms, with elevated temperature for 5 or 6 days and all died in 8 to 10 days. The results show no reduction in the virulence of the culture.

SUMMARY

The rickettsiae of Rocky Mountain spotted fever have been cultivated through 15 passages in modified Maitland media, using as tissue the chorio-allantoic membrane of chick embryos and guinea pig tunica. Substitution of Baker's for Tyrode's solution brought about an increase in the number of rickettsiae in media containing chick embryo tissue and also gave good results in media with guinea pig

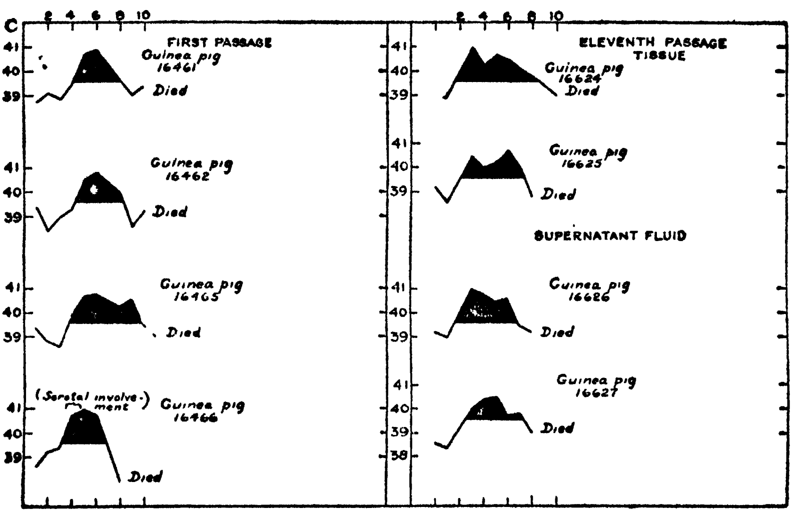


FIGURE 2.—Daily temperature record. B. R. 1150—Cultures inoculated intraperitoneally.

tunica. There was no loss of virulence in the rickettsiae thus cultivated, both tissue and supernatant fluid causing typical symptoms in guinea pigs followed by death.

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CULTIVATION OF THE RICKETTSIAE OF ENDEMIC (MURINE) AND EPIDEMIC (EUROPEAN) TYPHUS FEVER IN VITRO

By Ida A. Bengtson, *Senior Bacteriologist, National Institute of Health, United States Public Health Service*

Cultivation of the rickettsiae of endemic (murine) as well as epidemic (European) typhus fever has been reported by a number of workers. The most successful results by *in vitro* methods have been obtained by the use of the technique employed first by Nigg and Landsteiner (*1*), in which Maitland medium with Tyrode's solution, fresh guinea pig serum, and tunica vaginalis of the guinea pig was used. This method has been used by Kligler and Aschner (*2*), Plotz and Giroud (*3*), Zinsser and Machiavello (*4*), Breinl and Chrobok (*5*), and Nigg (*6*), and all report good growth without great difficulty.

The present report concerns the cultivation of the rickettsiae of endemic and European typhus fevers in the Maitland medium in which Baker's solution was substituted for Tyrode's solution. Previous experiments had shown that the growth of Rocky Mountain spotted fever rickettsiae had been enhanced by the use of Baker's solution in the medium, and it therefore seemed justifiable to employ the same medium for obtaining cultures of typhus fever rickettsiae.

ENDEMIC TYPHUS

THE STRAIN USED FOR CULTIVATION

The Wilmington strain of endemic typhus which has been maintained in guinea pigs at the National Institute of Health for a number of years was used for initiating cultures. One series of transplants was started with infected tunica vaginalis from a guinea pig (W 6208) on the 5th day of fever and the 4th day of testicular swelling. Another series was from a guinea pig (W 6219) on the 4th day of fever and the 1st day of testicular swelling. In both cases the infected tissue was minced and used as the tissue component of the Maitland medium.

TECHNIQUE

Maitland medium was prepared by combining 1 part of fresh guinea pig serum with 4 parts of Baker's solution. Usually 1 cc of serum and 4 cc of Baker's solution were used in 50-cc Erlenmeyer flasks. Occasionally four times these amounts were used in 200-cc flasks. Fresh guinea pig tunica was used as tissue. All cultures were incubated at 37° C. and transferred at intervals of 7 to 12 days. In making transfers the culture from the flask was removed to a small, pointed centrifuge tube containing a small amount of powdered pyrex glass and centrifuged at low speed for about 10 minutes to precipitate the tissue. The supernatant fluid was then removed and

the infected tissue was macerated with a glass rod. An amount of Baker's solution measuring about 0.5 cc was added to the macerated tissue, the tube was shaken, and the coarser particles of tissue were allowed to settle. The supernatant fluid was then transferred to the sterile watch glass containing the fresh tunica in a small amount of Baker's solution. In some cases a suspension of the macerated tissue instead of the extract was used as inoculum. After the material had been minced and allowed to stand for 10 to 15 minutes, it was divided among 4 Erlenmeyer flasks containing 5 cc of the fluid medium. Incubation was continued for 7 to 10 days at 37° C. Slide preparations were made from all flasks and stained with Giemsa, and transfers were made from those showing the largest numbers of rickettsiae.

RESULTS

Growth of rickettsiae was good from the beginning. In the two series referred to, the number of rickettsiae increased after one or two transplants. In another series, which was not continued, the number of rickettsiae was recorded as 4 plus in the first passage. Two series of cultures were carried through 17 transplants each. The relative number of rickettsiae in the first 15 passages of one of the series of transplants is shown in table 1.

TABLE 1.—*Relative number of rickettsia in the first 15 passages of one series of transplants*

Passage No.	Tissue	Rickettsiae in flasks
1	Tp	1+, 2++, 3C, 4+++, 5C, 6++
2	Tp	1+, 2++, 3+, 4+, 5++, 6++
3	Tp	1+++, 2++, 3C, 4C, 5+++, 6++++, 7++++, 8++++
4	Tp	1+++, 2+++, 3+++, 4+++, 5C, 6+, 7+++
	Tv	8+++, 9++++, 10++++, 11++++, 12++++, 13++++, 14+++, 15+++, 16++++
5	Tp	1++++, 2C, 3++, 4++, 5+++, 6+++, 7+++, 8+++
	Tv	9++, 10++, 11+++, 12+++, 13++, 14++++, 15+++, 16+++
6	Tp	1+++, 2++++, 3+++, 4++++, 5++, 6+, 7+++, 8++
	Tv	9+++, 10++++, 11++++, 12++, 13++, 14+++, 15+++
7	Tp	1++, 2++++, 3+++, 4C, 5++++, 6++, 7++++, 8+++
	Tv	9C, 10C, 11++++, 12++++, 13++++, 14+++, 15C, 16++++
8	Tp	1C, 2+++, 3+++, 4++++, 5+++, 6++++, 7++, 8C
	Tv	9++++, 10++++, 11++, 12++++
9	Tp	1++++, 2++++, 3++++, 4++++
	Tv	5+++, 6+++, 7++, 8+, 9++++, 10++, 11++, 12+++
10	Tp	1+++, 2+++, 3+++, 4++, 5++, 6+, 7++, 8++
	Tv	9+++, 10++, 11++, 12++, 13+++, 14++, 15+++, 16++
11	Tp	1C, 2++, 3++, 4++, 5++++, 6++++, 7++++, 8++++
	Tv	9++, 10+++, 11++, 12+++
12	Tp	1++, 2C, 3+++, 4++, 5+++, 6C, 7+++, 8+++
	Tv	9++++, 10+++, 11++++, 12++++, 13++, 14++++, 15++, 16+++
13	Tp	1C, 2++++, 3+++, 4C, 5+++, 6++++, 7+++, 8++++
	Tv	9++, 10+++, 11+, 12++, 13+, 14+++, 15C, 16+++
14	Tp	1+++, 2++++, 3++, 4C, 5++++, 6++++, 7+++, 8+++
	Tv	9++++, 10+++, 11+++, 12+++, 13+, 14++++, 15++++, 16++++
15 [1]	Tp	1++++, 2+++, 3+++, 4++, 5+, 6+, 7++, 8+
	Tv	9+, 10+, 11+, 12+, 13++++, 14++, 15++++, 16++++

[1] In passage 15, nos. 1-4, 13-16, planted with extract of macerated tissue; 5-8, 9-12, planted with supernatant fluid.

Tp = Parietal tunica.
Tv = Visceral tunica.
++++ to + = Numbers of rickettsiae grading from very numerous to very few.
C = contaminated.

The results obtained in media planted with the suspended macerated tissue of the previous passage and in those planted with extracts of the tissue or suspensions in which there was very little tissue did not vary greatly. The presence of the tissue, probably nonviable at the end of 8 to 10 days, might be thought to be detrimental to the continued viability of the fresh tissue. On the other hand, the possibility was considered whether the organisms might become more adapted to nonliving tissue. However, the results varied very little with the different methods used and therefore no conclusions could be drawn.

For the 15th passage, half of the flasks were planted with extract of the macerated tissue in the usual way and the remaining flasks with 0.5 cc of the supernatant fluid in flasks which had been vigorously shaken and then centrifuged at low speed for 10 minutes to precipitate the tissue. There were comparatively few rickettsiae in the flasks planted with the supernatant fluid (+ to ++), indicating that the organisms were not numerous in the fluid portion of the cultures used for transplanting and that a rather heavy inoculum, such as is found in the tissue, is necessary for good growth.

RICKETTSIAE

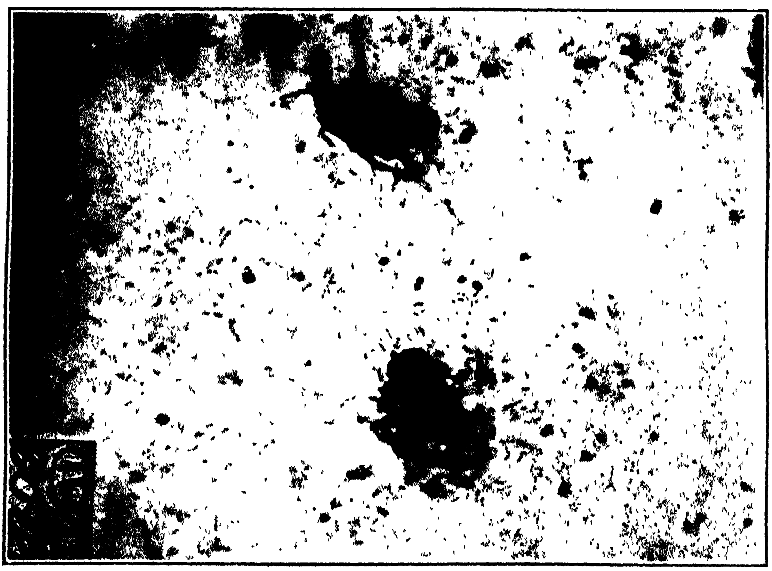
Technique for staining.[1]—In the preparation of the films on slides for demonstrating rickettsiae several pieces of infected tissue are removed from the flask with a platinum loop, taking care to free the tissue from excess fluid by touching it to the side of the flask. After placing the tissue on the slide, the slide is warmed slightly by passing over the flame. This causes the evaporation of the remaining fluid and allows better maceration of the tissue, which is spread out with the loop in a very thin layer. After being dried in the air the preparation is covered with methyl alcohol, which, after about 30 seconds, is removed for the most part by blotting. The slide is then passed through the pilot flame of the Bunsen burner to remove all further traces of the methyl alcohol. The slides are then stained by flooding with Giemsa in a 1 to 10 dilution, the stain remaining on for 1 to 2 hours. They are then rinsed with tap water and slightly decolorized with 95-percent ethyl alcohol (2 to 3 seconds) and blotted with blotting paper. Preparations are thus obtained which are free from precipitate and in which the rickettsiae are sharply defined though stained lightly.

As in the Rocky Mountain spotted fever cultures, rickettsiae did not appear as closely associated with the cells as has been described by other workers (Kligler and Aschner, Plotz and Giroud, and others) (pls. I and II). It was rare to find rickettsiae which were confined to the cytoplasm of the cells. Rather they were distributed through-

[1] The writer is indebted to R. D. Reed, bacteriological technician, for development of this method of staining.

Rickettsiae of endemic typhus fever. (X 1900, approximately.)

Rickettsiae of endemic typhus fever (× 1900, approximately)



Culture of rickettsiae of endemic typhus fever with a contaminating organism. Shows contrast in size and staining properties of rickettsiae and ordinary bacteria. (× 750.)

Rickettsiae of endemic typhus fever packed in cytoplasm of cell (× 1900, approximately.)

Rickettsiae of European typhus.

out the preparations, perhaps more often in the neighborhood of tissue but also frequently in localities where there was no tissue. Often the distribution of the rickettsiae on the slide resembled that of a culture of bacteria. Apparently the cells or rather the cytoplasm of the cells disintegrated easily in preparing the smear. One of the few cells showing rickettsiae in the intact cytoplasm is shown in plate III.

Although the appearance of the film preparations suggested that multiplication of the rickettsiae might occur to some extent outside the cells, there was no evidence of turbidity in the fluid portion of the medium. Tests of the fluid by inoculation into guinea pigs showed that, though the disease could be produced with this material, it was

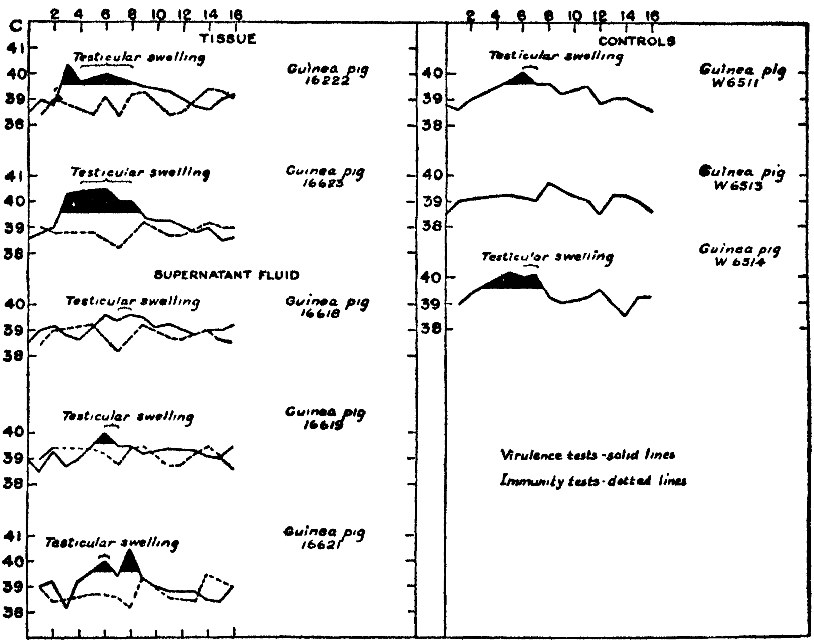


FIGURE 1.—Daily temperature record, W. 6219. Cultures inoculated intraperitoneally.

less severe than that produced by the tissue. Cultures in the eleventh passage were centrifuged for about 10 minutes at the lowest speed of the centrifuge and the supernatant fluid was removed. The macerated precipitate suspended in salt solution and the supernatant fluid were inoculated into guinea pigs. The macerated tissue (1 culture) brought about typical symptoms in 2 guinea pigs, the temperature becoming elevated on the 3d day after inoculation and continuing for 6 days, with testicular swelling lasting 5 days (fig. 1). The 4 animals inoculated with the supernatant fluid (from 2 flasks) showed a temperature rise beginning on the sixth or seventh day and continuing for 1 or 2 days. Redness and swelling of the testicles was present for 1 or 2

days. Immunity tests carried out a month later, however, showed all 6 animals to be immune.

EPIDEMIC (EUROPEAN) TYPHUS

The Breinl strain of European typhus maintained in guinea pigs in this laboratory was used for cultivation purposes. The infected tunica vaginalis of a guinea pig on the second day of fever (40.5° C.) was used for initiating growth.

The technique employed was the same as that used for endemic typhus, transfers being made at intervals of from 8 to 11 days.

The results obtained with transfers made through 6 passages are shown in table 2. The number of rickettsiae increased after the first three generations, and after the fourth they were almost as numerous in some flasks as were those of the endemic typhus. There was a tendency for these rickettsiae to be more closely associated with the cells than was the case with the endemic typhus, but large numbers of rickettsiae were found also outside the cells. Morphologically the two were indistinguishable (pl. IV). Virulence tests were not made on animals.

TABLE 2.—*Relative numbers of rickettsiae in 6 transplants of European typhus (W4502)*

Passage No.	Tissue	Rickettsiae in flasks
1	Tp	1+, 2C, 3+, 4+, 5+, 6+, 7+++, 8+
2	Tp	1++, 2+, 3+, 4C
3	Tp	1−, 2+, 3++, 4−
4	Tp	1+, 2++, 3+++, 4++
	Tv	5+, 6+, 7+++, 8++
5	Tp	1++++, 2++++, 3+, 4−
	Tv	5+++, 6+, 7+, 8++
6	Tp	1+, 2++, 3++, 4+++
	Tv	5++, 6++++, 7+++, 8++++

Tp = Parietal tunica.
Tv = Visceral tunica.

SUMMARY

The rickettsiae of endemic typhus fever has been cultivated *in vitro* through 17 passages. Luxuriant growths were obtained in modified Maitland media in which Baker's solution was substituted for Tyrode's solution. The rickettsiae of European typhus grew almost as luxuriantly in similar media.

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CHOLERA IN CHINA

Since the middle of August, numbers of reports of cholera prevalence in Chinese cities and seaports have reached the Public Health Service, indicating that this disease is at present rather widespread in China, involving, to date, Shanghai, Hong Kong, Canton, Hoihow, Macao, and probably other cities, in particular Amoy and Foochow being under suspicion. It is now feared that military operations in China may cause a further spread of the disease. Cases of the disease were reported in Hong Kong during the latter part of July and the number of cases and deaths increased rapidly from the second week in August. From July 26 to August 24, 1937, 802 cases, with 427 deaths, were reported in Hong Kong, and over 500 cases from the latter date to September 11.

To prevent the introduction of cholera into the Philippine Islands, the chief quarantine officer detailed to this duty by the United States Public Health Service has directed all quarantine officers to carry out very careful inspection of ships, passengers, and crew from infected or suspected ports, including bacteriological examination to detect carriers. He is acting in close cooperation with the Public Health Service officer stationed at Hong Kong, the Chinese Quarantine Service, and with the Eastern Bureau of the League of Nations, with headquarters at Singapore. Principally, these cooperative efforts are to institute measures that will prevent embarkation of infected persons.

It is not believed by Public Health Service quarantine officers that the west coast seaports of the United States are likely to become infected, for the reason that, since the incubation period of cholera is only 5 days, outbreaks on shipboard will occur and the disease will become manifest long before a ship from infected ports could reach any United States seaport. However, the possibility of introduction of the disease by carrier is not being overlooked, and bacteriological search is being conducted for carriers whenever indicated. Ships from cholera-infected areas are not granted radio pratique.

Through passengers from infected areas traveling by Pan American Clipper airships will probably not be inconvenienced, since they will have completed the incubation period by the time they reach San Francisco, but those stopping off en route will be held at stop-over points to complete the incubation period.

Because protected water supplies and protected milk supplies are the rule instead of the exception in American cities today, cholera is no longer the menace to this country that it was during the last century.

DEATHS DURING WEEK ENDED SEPT. 4, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 4, 1937	Corresponding week, 1936
Data from 85 large cities of the United States:		
Total deaths	7,465	6,867
Average for 3 prior years	6,875	
Total deaths, first 35 weeks of year	308,437	308,781
Deaths under 1 year of age	504	485
Average for 3 prior years	516	
Deaths under 1 year of age, first 35 weeks of year	19,757	19,447
Data from industrial insurance companies:		
Policies in force	69,770,573	68,372,148
Number of death claims	11,041	10,527
Death claims per 1,000 policies in force, annual rate	8.3	8.1
Death claims per 1,000 policies, first 35 weeks of year, annual rate	10.1	10.2

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 11, 1937, and Sept. 12, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept 11, 1937	Week ended Sept 12, 1936	Week ended Sept 11, 1937	Week ended Sept 12, 1936	Week ended Sept 11, 1937	Week ended Sept 12, 1936	Week ended Sept 11, 1937	Week ended Sept 12, 1936
New England States:								
Maine					1		1	0
New Hampshire					3	2	0	0
Vermont	1				12		0	0
Massachusetts	2	6			11	30	0	1
Rhode Island						1	1	0
Connecticut	6	4	1		3	4	0	0
Middle Atlantic States:								
New York	13	10	[1] 2	[1] 7	92	44	3	10
New Jersey	3	2	7	7	17	20	0	2
Pennsylvania	10	11			115	14	2	5
East North Central States								
Ohio [2]	22	14	14	14	36	9	2	2
Indiana	12	10	11	9	7	3	1	1
Illinois [3]	8	19	7	3	45	6	1	3
Michigan	20	12			21	9	2	3
Wisconsin	4	2	30	6	28	12	1	1
West North Central States:								
Minnesota		5		2	10	6	0	0
Iowa	1	2			3		1	1
Missouri	12	10	19	14	23	1	2	2
North Dakota	1	1		5		2	2	0
South Dakota						5	0	0
Nebraska	1	6			2	3	0	0
Kansas	8	9	4	1	1	4	0	0
South Atlantic States:								
Delaware							0	0
Maryland [4]	6	4	2	1	1	9	1	3
District of Columbia	1	9	2		2		2	1
Virginia [2]	37	33			14	7	2	3
West Virginia	7	7	15	14	12		1	3
North Carolina [2]	36	65		6	9		2	4
South Carolina [5]	24	18	91	67	5		0	1
Georgia [5]	31	28					1	0
Florida [5]	4	10				3	1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officer for weeks ended Sept. 11, 1937, and Sept. 12, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936
East South Central States:								
Kentucky	14	9	3		17	17	2	10
Tennessee [5]	26	29	6	7	64	8	1	5
Alabama [5]	31	31	3	13	3		2	2
Mississippi [4]	19	15					0	2
West South Central States:								
Arkansas	9	17		3	2		0	0
Louisiana	4	7	3	17	5		0	1
Oklahoma [6]	11	10	20	7	2	1	0	0
Texas [5]	29	33	58	24	30	9	6	1
Mountain States:								
Montana	1	8			2	1	0	0
Idaho	1	1	2		1		0	0
Wyoming		1					0	0
Colorado	5				18	2	1	0
New Mexico	5	2			4	3	0	0
Arizona		3	12	23	3	1	0	0
Utah [4]	4				3	3	0	0
Pacific States:								
Washington	3				29	18	1	0
Oregon	1	1	7	1	2	3	1	1
California [2] [5]	20	22	11	18	23	18	1	0
Total	453	486	330	269	684	273	44	68
First 36 weeks of year	14,870	15,975	275,454	140,787	243,237	268,372	4,336	6,061

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936
New England States:								
Maine	12	4	8	6	0	0	8	0
New Hampshire	0	0		3	0	0	0	0
Vermont	1	0	1	1	0	0	0	0
Massachusetts	44	4	18	34	0	0	2	6
Rhode Island	0	0	5	5	0	0	1	3
Connecticut	13	0	7	10	0	0	5	2
Middle Atlantic States:								
New York	91	11	55	100	0	0	20	20
New Jersey	13	1	18	17	0	0	14	19
Pennsylvania	37	7	52	82	0	0	33	43
East North Central States:								
Ohio [2]	66	18	88	83	0	0	101	69
Indiana	18	2	17	26	3	0	3	13
Illinois [3]	130	52	78	66	0	3	35	20
Michigan	49	2	61	47	0	0	10	14
Wisconsin	19	4	26	55	0	1	3	1
West North Central States:								
Minnesota	30	1	18	19	4	0	2	0
Iowa	26	7	25	24	1	1	2	2
Missouri	36	5	43	18	3	0	23	81
North Dakota	1	0		4	2	0	3	1
South Dakota	4	0	3	10	0	0	2	3
Nebraska	27	3	1	5	1	1	0	1
Kansas	20	5	37	26	1	0	9	9
South Atlantic States:								
Delaware	5	0			0	0	1	1
Maryland [4]	11	1	15	15	0	0	12	11
District of Columbia	0	0	3	10	0	0	0	1
Virginia [2]	3	2	16	11	0	0	13	27
West Virginia	2	4	29	30	0	0	19	23
North Carolina [2]	1	2	20	23	0	0	9	13
South Carolina [6]	1	0	1	5	0	0	19	16
Georgia [5]	0	12	15	2	0	0	23	88
Florida [5]	4	0	1	2	0	0	5	2

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 11, 1937, and Sept. 12, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936	Week ended Sept. 11, 1937	Week ended Sept. 12, 1936
East South Central States:								
Kentucky	4	1	26	28	0	0	40	43
Tennessee [5]	3	21	25	25	0	0	39	44
Alabama [5]	7	15	17	11	0	0	21	28
Mississippi [4]	10	5	12	8	0	1	13	24
West South Central States:								
Arkansas	12	0	9	3	0	0	12	17
Louisiana	7	1	3	4	0	0	19	26
Oklahoma [6]	14	1	8	6	4	0	18	28
Texas [5]	21	1	24	19	0	0	48	29
Mountain States:								
Montana	1	1	5	11	5	10	4	6
Idaho	0	2	2	1	10	0	0	1
Wyoming	2	1	2	6	1	0	1	1
Colorado	21	4	8	8	4	2	2	2
New Mexico	1	0	5	5	0	0	6	10
Arizona	2	0	5	1	0	0	2	0
Utah [4]	5	1	12	13	0	1	1	1
Pacific States:								
Washington	2	2	14	13	11	2	3	5
Oregon	4	2	7	10	4	0	3	8
California [2] [5]	37	13	65	75	2	0	27	7
Total	817	218	910	986	50	22	636	669
First 36 weeks of year	5,512	2,019	167,490	181,410	8,136	6,026	10,010	9,169

[1] New York City only.
[2] Rocky Mountain spotted fever, week ended Sept. 11, 1937, 6 cases, as follows: Ohio, 1; Virginia, 3; North Carolina, 1; California, 1.
[3] Figures include delayed reports from Chicago for the preceding week.
[4] Week ended earlier than Saturday.
[5] Typhus fever, week ended Sept 11, 1937, 100 cases, as follows: South Carolina, 8; Georgia, 37, Florida, 8; Tennessee, 1; Alabama, 32; Texas, 13; California, 1
[6] Figures for 1936 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July 1937										
South Dakota	1	2	2	-------	5	-------	1	42	1	4
August 1937										
Connecticut	1	25	2	-------	51	-------	19	38	0	5
Delaware	-------	-------	-------	-------	2	-------	1	9	0	7
Idaho	1	5	9	-------	7	-------	0	28	17	5
Iowa	1	5	3	1	20	-------	37	71	16	22
North Carolina	11	94	-------	174	130	42	23	82	0	99
Pennsylvania	28	70	-------	4	756	1	78	359	0	144
West Virginia	6	29	52	-------	34	1	17	85	1	83
Wyoming	-------	1	-------	1	9	-------	18	6	0	2

SUMMARY OF MONTHLY REPORTS FROM STATES—Continued

July 1937

	Cases
South Dakota:	
Anthrax	3
Chicken pox	14
Mumps	14
Septic sore throat	4
Trachoma	2
Undulant fever	1
Whooping cough	29

August 1937

	Cases
Actinomycosis:	
Connecticut	1
Anthrax:	
Pennsylvania	3
Chicken pox:	
Connecticut	23
Delaware	1
Idaho	11
Iowa	10
North Carolina	25
Pennsylvania	207
West Virginia	11
Wyoming	7
Colorado tick fever:	
Wyoming	1
Dysentery:	
Connecticut (bacillary)	1
Delaware (amoebic)	3
Delaware (bacillary)	1
Pennsylvania (amoebic)	13
Encephalitis, epidemic or lethargic:	
Pennsylvania	5

August 1937—Continued

	Cases
German measles:	
Connecticut	6
Idaho	1
Iowa	2
Pennsylvania	38
Impetigo contagiosa:	
Delaware	2
Lead poisoning:	
Connecticut	1
Mumps:	
Connecticut	65
Delaware	6
Idaho	25
Iowa	8
Pennsylvania	387
West Virginia	1
Wyoming	9
Ophthalmia neonatorum:	
Connecticut	1
Delaware	2
Pennsylvania	4
Paratyphoid fever:	
Connecticut	1
Iowa	1
North Carolina	1
Rabies in animals:	
Connecticut	4
West Virginia	1
Rocky Mountain spotted fever:	
Iowa	2
North Carolina	6
Pennsylvania	1
West Virginia	2
Wyoming	2

August 1937—Continued

	Cases
Septic sore throat:	
Connecticut	7
Idaho	13
North Carolina	11
Wyoming	1
Tetanus:	
Connecticut	1
Delaware	1
Trachoma:	
Iowa	2
Tularaemia:	
North Carolina	1
Wyoming	1
Typhus fever:	
Connecticut	1
Delaware	1
North Carolina	5
Undulant fever:	
Connecticut	10
Idaho	2
Iowa	14
North Carolina	2
Pennsylvania	12
West Virginia	1
Vincent's infection:	
Idaho	5
Iowa	1
Whooping cough:	
Connecticut	122
Delaware	30
Idaho	29
Iowa	130
North Carolina	720
Pennsylvania	1,711
West Virginia	239
Wyoming	66

CASES OF VENEREAL DISEASES REPORTED FOR JUNE 1937

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

State	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama	696	2.43	122	0.43
Arizona	58	1.43	113	2.78
Arkansas [1]	296	1.46	100	.49
California	1,884	3.11	1,879	3.10
Colorado	148	1.39	61	.57
Connecticut	334	1.93	131	.76
Delaware	209	8.07	45	1.74
District of Columbia	197	3.18	171	2.76
Florida	89	.51	31	.19
Georgia	1,866	6.10	499	1.63
Idaho	36	.74	45	.93
Illinois	2,130	2.72	1,269	1.62
Indiana	187	.54	131	.38
Iowa [1]	306	1.20	220	.87
Kansas	169	.90	78	.41
Kentucky	537	1.86	349	1.21
Louisiana	286	1.35	164	.77
Maine [1]	34	.40	46	.54
Maryland [4]	835	4.90	329	1.97
Massachusetts	511	1.15	472	1.07
Michigan	588	1.23	586	1.23
Minnesota	351	1.33	244	.93
Mississippi	1,999	9.96	2,466	12.28
Missouri	341	.86	488	1.23
Montana [2]				
Nebraska [3]	153	1.12	132	.97
Nevada [2]				
New Hampshire [2]				
New Jersey	801	1.85	321	.74

See footnotes at end of table.

Reports from States—Continued

State	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
New Mexico [3]				
New York	8,172	6.32	2,086	1.61
North Carolina	2,544	7.36	465	1.35
North Dakota	41	.58	46	.65
Ohio [1]	1,361	2.03	371	.55
Oklahoma [1]	349	1.38	364	1.44
Oregon	99	.97	200	1.97
Pennsylvania [4]	2,057	2.03	269	.27
Rhode Island	108	1.59	59	.87
South Carolina [1]	389	2.09	373	2.01
South Dakota	36	.52	24	.35
Tennessee	652	2.28	293	1.02
Texas	1,010	1.65	384	.63
Utah [3]				
Vermont	12	.32	22	.58
Virginia	1,427	5.34	306	1.15
Washington	253	1.54	398	2.42
West Virginia	361	1.97	92	.50
Wisconsin [4]	21	.07	175	.60
Wyoming [3]				
Total	33,733	2.67	16,419	1.30

Reports from cities of 200,000 population or over

City	Syphilis cases	Syphilis rate	Gonorrhea cases	Gonorrhea rate
Akron, Ohio [2]				
Atlanta, Ga	143	4.98	144	5.02
Baltimore, Md	525	6.36	237	2.87
Birmingham, Ala	150	5.31	63	2.23
Boston, Mass	190	2.40	203	2.57
Buffalo, N. Y	185	3.13	100	1.69
Chicago, Ill	1,157	3.24	837	2.35
Cincinnati, Ohio	185	3.97	79	1.70
Cleveland, Ohio	330	3.55	104	1.12
Columbus, Ohio	115	3.76	22	.72
Dallas, Tex	206	7.11	75	2.59
Dayton, Ohio	86	4.09	29	1.36
Denver, Colo	94	3.17	37	1.25
Detroit, Mich [2]				
Houston, Tex. [5]	212	6.33	72	2.15
Indianapolis, Ind	21	.56	34	.90
Jersey City, N. J. [2]				
Kansas City, Mo	40	.95	5	.12
Los Angeles, Calif. [2]				
Louisville, Ky	203	6.27	133	4.10
Memphis, Tenn	208	7.79	60	2.25
Milwaukee, Wis. [2]				
Minneapolis, Minn	94	1.93	94	1.93
Newark, N. J	276	5.96	123	2.65
New Orleans, La. [2]				
New York, N. Y	6,580	9.01	1,386	1.90
Oakland, Calif	32	1.06	31	1.02
Omaha, Nebr	68	3.08	50	2.27
Philadelphia, Pa	436	2.19	71	.36
Pittsburgh, Pa	76	1.11	22	.32
Portland, Oreg. [2]				
Providence, R. I	59	2.28	31	1.20
Rochester, N. Y	50	1.48	45	1.33
St. Louis, Mo	188	2.25	153	1.83
St. Paul, Minn	42	1.49	29	1.03
San Antonio, Tex. [2]				
San Francisco, Calif	114	1.70	145	2.16
Seattle, Wash	130	3.42	201	5.30
Syracuse, N. Y	107	4.91	69	3.17
Toledo, Ohio [2]				
Washington, D. C. [6]	197	3.18	171	2.76

[1] Incomplete.
[2] No report for current month.
[3] Not reporting.
[4] Only cases of syphilis in the infectious stage are reported.
[5] Reported by Jefferson Davis Hospital; physicians are not required to report venereal diseases.
[6] Reported by the Social Hygiene Clinic.

WEEKLY REPORTS FROM CITIES

City reports for week ended Sept. 4, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	128	60	14	138	280	287	3	352	107	969	--------
Current week [1]	70	20	10	205	316	233	1	287	88	1,205	--------
Maine:											
Portland	0	------	0	0	2	0	0	0	0	5	32
New Hampshire:											
Concord	0	------	0	0	0	0	0	1	0	0	8
Manchester	0	------	0	0	0	0	0	0	0	0	10
Nashua	0	------	0	0	0	0	0	0	0	2	9
Vermont											
Barre	0	------	0	0	1	0	0	1	0	0	5
Burlington	0	------	0	0	0	0	0	0	0	0	7
Rutland	0	------	0	0	0	0	0	0	0	0	--------
Massachusetts:											
Boston	1	------	0	4	11	3	0	8	2	16	227
Fall River	1	------	1	1	0	0	0	1	0	15	17
Springfield	0	------	0	0	0	1	0	0	0	9	21
Worcester	1	------	0	1	5	1	0	2	0	4	48
Rhode Island.											
Providence	1	------	0	0	3	3	0	4	0	72	59
Connecticut.											
Bridgeport	0	------	0	0	0	0	0	2	0	1	37
Hartford	0	------	0	0	1	1	0	3	0	5	42
New Haven	0	------	0	1	0	1	0	0	1	7	28
New York:											
Buffalo	1	------	0	2	8	5	0 [2]	6	0	18	138
New York	10	------	1	38	62	24	0	------	16	149	1,201
Rochester	0	------	0	0	2	0	0	0	0	3	58
Syracuse	0	------	0	0	1	3	0	1	0	10	49
New Jersey:											
Camden	0	------	0	0	0	1	0	1	0	0	28
Newark	0	------	0	3	1	0	0	2	0	16	82
Trenton	0	------	0	1	2	0	0	2	0	4	22
Pennsylvania:											
Philadelphia	2	1	1	6	12	5	0	21	16	31	351
Pittsburgh	1	------	0	17	9	12	0	8	2	61	165
Reading	0	------	0	1	0	0	0	0	0	0	20
Scranton	0	------	--------	0	-------	1	0	-------	0	5	--------
Ohio:											
Cincinnati	------	------	--------	------	------	------	------	------	------	------	--------
Cleveland	1	5	1	15	8	13	0	9	0	26	177
Columbus	1	2	2	1	4	1	0	0	2	2	74
Toledo	0	1	1	1	1	1	0	6	5	5	84
Indiana:											
Anderson	0	------	0	1	0	1	0	0	0	1	11
Fort Wayne	0	------	0	0	2	0	0	0	0	3	23
Indianapolis	1	------	0	5	4	5	0	5	0	34	95
South Bend	0	------	0	1	1	1	0	0	0	3	17
Terre Haute	0	------	0	0	0	0	0	0	0	0	11
Illinois:											
Alton	0	------	0	1	0	0	0	0	0	0	9
Chicago	5	2	0	29	21	35	0	48	0	64	711
Elgin	0	------	0	0	1	0	0	0	0	0	8
Moline	0	------	0	0	0	0	0	1	0	6	6
Springfield	0	------	0	0	3	2	0	0	0	8	24
Michigan:											
Detroit	5	------	0	12	7	17	0	22	2	91	226
Flint	0	------	0	0	1	6	0	0	1	15	36
Grand Rapids	0	------	0	0	0	4	0	2	0	17	36
Wisconsin:											
Kenosha	0	------	0	0	0	1	0	0	0	4	8
Madison	0	------	0	0	0	1	0	0	0	7	17
Milwaukee	1	------	0	13	2	4	0	5	0	58	100
Racine	0	------	0	3	0	0	0	0	0	1	17
Superior	0	------	0	0	0	0	0	0	0	1	10

[1] Figures for Cincinnati, Little Rock, and Boise estimated; reports not received.
[2] The report of 11 cases of smallpox in Buffalo for the week ended Feb. 20, 1937 (Pub. Health Rep. Mar. 12, 1937, p. 319), was an error. These were cases of chicken pox.

City reports for week ended Sept. 4, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Minnesota:											
Duluth	0	------	0	0	2	1	0	0	0	16	23
Minneapolis	0	------	0	2	2	3	0	2	0	8	97
St. Paul	0	------	0	0	5	1	0	2	0	11	49
Iowa:											
Cedar Rapids	0	------	------	1	------	0	0	------	0	2	------
Davenport	0	------	------	0	------	1	0	------	0	0	------
Des Moines	0	------	------	0	------	4	0	------	0	0	25
Sioux City	1	------	------	0	------	5	0	1	0	1	------
Waterloo	0	------	------	0	------	2	0	------	0	1	------
Missouri:											
Kansas City	4	------	0	0	4	3	0	2	0	2	65
St. Joseph	0	------	0	0	3	0	0	0	0	0	31
St. Louis	3	------	0	11	10	10	0	8	2	8	241
North Dakota:											
Fargo	0	------	0	0	0	0	0	0	0	9	12
Grand Forks	0	------	------	0	------	0	1	------	0	0	------
Minot	0	------	------	0	------	0	0	------	0	0	7
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	7	------
Nebraska:											
Omaha	0	------	0	0	3	0	0	0	1	0	47
Kansas:											
Lawrence	0	------	0	0	0	0	0	0	0	0	3
Topeka	0	------	1	0	1	1	0	0	0	7	14
Wichita	1	------	0	1	1	1	0	1	0	7	------
Delaware:											
Wilmington	0	------	0	0	2	0	0	0	0	3	23
Maryland:											
Baltimore	3	2	0	1	8	7	0	13	3	69	210
Cumberland	0	------	0	0	0	0	0	0	0	8	10
Frederick	0	------	0	0	0	0	0	0	0	0	5
Dist. of Col.:											
Washington	5	------	0	4	8	2	0	11	5	13	136
Virginia:											
Lynchburg	1	------	0	0	0	0	0	0	1	0	6
Norfolk	0	------	0	0	0	0	0	1	1	1	22
Richmond	0	------	0	0	1	1	0	1	0	1	36
Roanoke	0	------	0	0	0	1	0	1	0	2	14
West Virginia:											
Charleston	1	------	0	0	2	0	0	1	1	0	13
Huntington	1	------	------	0	------	2	0	------	0	0	------
Wheeling	0	------	0	0	0	0	0	0	0	3	20
North Carolina:											
Gastonia	0	------	------	0	------	0	0	------	0	0	------
Raleigh	0	------	0	0	0	0	0	0	0	21	15
Wilmington	0	------	0	0	1	0	0	0	0	1	8
Winston-Salem	0	------	0	0	2	1	0	0	2	8	------
South Carolina:											
Charleston	0	------	1	0	0	1	0	0	3	0	18
Columbia	0	------	0	0	1	0	0	2	0	0	8
Florence	0	------	0	0	0	0	0	0	0	0	13
Greenville	0	------	0	1	0	0	0	0	0	4	6
Georgia:											
Atlanta	1	------	0	0	3	1	0	1	2	16	63
Brunswick	0	------	0	0	0	0	0	0	0	0	3
Savannah	2	------	0	0	0	0	0	2	4	0	17
Florida:											
Miami	0	------	0	6	3	0	0	2	2	0	50
Tampa	0	------	0	0	0	1	0	0	0	5	20
Kentucky:											
Covington	0	------	0	0	1	1	0	0	0	0	15
Lexington	0	------	0	0	0	0	0	2	0	5	23
Louisville	1	------	0	0	4	3	0	3	[3] 0	14	67
Tennessee:											
Knoxville	1	------	0	0	0	0	0	2	1	0	17
Memphis	0	------	0	1	2	4	0	3	4	12	73
Nashville	0	------	0	2	3	2	0	1	3	13	45
Alabama:											
Birmingham	3	1	0	0	2	2	0	9	3	3	75
Mobile	1	------	0	0	4	1	0	1	0	0	32
Montgomery	0	1	------	0	------	2	0	------	0	1	------

[3] The report of 16 cases of typhoid fever in Louisville for the week ended Mar. 27, 1937 (Pub. Health Rep., Apr. 16, 1937, p 503), was an error. These were cases of whooping cough.

City reports for week ended Sept. 4, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Arkansas:											
Fort Smith	0	------	------	0	------	2	0	------	1	1	------
Little Rock	------	------	------	------	------	------	------	------	------	------	------
Louisiana:											
Lake Charles	0	------	0	0	1	0	0	0	0	0	10
New Orleans	3	------	0	0	13	2	0	15	2	9	170
Shreveport	0	------	0	0	1	0	0	2	0	0	36
Oklahoma:											
Muskogee	0	------	------	0	------	0	0	------	0	0	------
Oklahoma City	0	------	0	0	1	4	0	2	2	0	32
Tulsa	1	------	------	0	------	0	0	------	0	5	------
Texas:											
Dallas	2	------	0	1	1	2	0	1	5	17	31
Fort Worth	1	------	0	0	0	0	0	3	1	6	28
Galveston	0	------	0	0	2	0	0	0	0	0	16
Houston	0	------	0	0	5	0	0	3	0	0	68
San Antonio	1	------	1	0	2	0	0	8	1	0	54
Montana:											
Billings	0	------	0	0	0	0	0	0	0	0	8
Great Falls	0	------	0	0	0	0	0	0	0	4	10
Helena	0	------	0	0	0	2	0	0	0	3	9
Missoula	0	------	0	0	1	1	0	0	0	0	17
Idaho:											
Boise	------	------	------	------	------	------	------	------	------	------	------
Colorado:											
Colorado Springs	0	------	------	0	0	2	0	0	0	0	8
Denver	2	------	0	7	5	10	0	4	1	18	88
Pueblo	1	------	0	0	0	0	0	0	0	0	2
New Mexico:											
Albuquerque	0	------	0	0	------	0	0	2	1	1	10
Utah:											
Salt Lake City	2	------	0	3	5	4	0	0	0	13	36
Washington:											
Seattle	0	------	0	3	5	2	0	3	0	10	84
Spokane	0	------	0	1	4	3	0	1	0	5	27
Tacoma	0	------	1	0	1	0	0	0	0	1	36
Oregon:											
Portland	0	------	0	0	2	2	0	3	0	4	68
Salem	0	------	------	0	------	0	0	------	0	0	------
California:											
Los Angeles	1	4	0	5	14	6	1	17	1	47	287
Sacramento	1	------	0	0	1	1	0	4	1	7	20
San Francisco	0	3	0	2	4	2	0	6	0	39	157

City reports for week ended Sept. 4, 1937—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths	
Maine:			
Portland	0	0	8
New Hampshire:			
Nashua	0	0	1
Massachusetts:			
Boston	0	0	21
Springfield	0	0	1
Worcester	0	0	3
Rhode Island:			
Providence	0	0	3
Connecticut:			
Hartford	0	0	2
New York:			
Buffalo	0	0	2
New York	1	1	24
Syracuse	0	0	1
New Jersey:			
Newark	0	0	2
Pennsylvania:			
Philadelphia	1	0	3
Pittsburgh	0	0	2
Ohio:			
Cleveland	2	1	10
Columbus	0	0	2
Toledo	0	0	2
Indiana:			
Fort Wayne	0	0	1
Indianapolis	0	0	2
Illinois:			
Chicago	1	1	57
Elgin	0	0	2
Moline	0	0	1
Michigan:			
Detroit	0	0	22
Flint	0	0	1
Grand Rapids	0	0	1
Wisconsin:			
Madison	0	0	1
Milwaukee	0	0	13
Racine	0	0	1
Minnesota:			
Minneapolis	0	0	6
St. Paul	0	0	6
Iowa:			
Des Moines	0	0	3
Sioux City	0	0	2
Missouri:			
Kansas City	1	1	12
St Joseph	0	0	1
St. Louis	1	0	8
North Dakota:			
Minot	0	0	2
Nebraska:			
Omaha	0	0	15
Kansas:			
Lawrence	0	0	1
Wichita	0	0	2
Maryland:			
Baltimore	0	0	3
District of Columbia:			
Washington	1	1	4
Georgia:			
Atlanta	0	0	1
Florida:			
Tampa	0	0	1
Kentucky:			
Lexington	1	0	0
Louisville	1	0	1
Tennessee:			
Memphis	0	0	1
Louisiana:			
Shreveport	0	0	1
Oklahoma:			
Oklahoma City	0	0	1
Tulsa	0	0	1
Colorado:			
Colorado Springs	0	0	3
Denver	0	0	5
Pueblo	0	0	7
Washington:			
Tacoma	1	0	0
California:			
Los Angeles	1	0	14
Sacramento	0	0	2

Encephalitis, epidemic or lethargic.—Cases Philadelphia, 1; Toledo, 1; Minneapolis, 1; St. Louis, 52; Sacramento, 1; San Francisco, 1.

Pellagra.—Cases: Boston, 1; Philadelphia, 1; Atlanta, 2. Birmingham, 1; New Orleans, 1.

Typhus fever.—Cases: Charleston, S. C., 1; Atlanta, 1; Miami, 3, Mobile, 1, Montgomery, 1; Fort Worth, 1; Los Angeles, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended August 28, 1937.—During the 2 weeks ended August 28, 1937, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				3	4	1	1		1	10
Chicken pox				20	69	11	23	3	13	139
Diphtheria		2	2	60	5	9	3			81
Dysentery				3	4					7
Erysipelas				1	2		3	3	2	11
Influenza	3	4		1		3			2	13
Lethargic encephalitis				1			1			2
Measles		5	1	47	118	14	107	36	30	358
Mumps					50	2	1	2	10	65
Paratyphoid fever					6			1		7
Pneumonia	4				34		2		5	45
Poliomyelitis		9	2	34	566	18	37	13	1	680
Scarlet fever		9	3	88	78	11	21	36	22	268
Smallpox							1			1
Trachoma									1	1
Tuberculosis	1	54	15	105	71	3		1	25	275
Typhoid fever		3	7	55	22	2	4	3	3	99
Undulant fever				1	4				1	6
Whooping cough				307	215	119	21	3	12	677

CUBA

Habana—Communicable diseases—4 weeks ended August 28, 1937.—During the 4 weeks ended August 28, 1937, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	16	1	Tuberculosis	15	1
Malaria	[1] 23		Typhoid fever	[1] 25	3
Poliomyelitis	1		Undulant fever	1	

[1] Includes imported cases.

LATVIA

Notifiable diseases—June 1937.—During the month of June 1937, cases of certain notifiable diseases were reported in Latvia as follows:

Disease	Cases	Disease	Cases
Botulism	3	Mumps	26
Cerebrospinal meningitis	10	Paratyphoid fever	15
Diphtheria	62	Puerperal septicemia	7
Dysentery	1	Scarlet fever	253
Erysipelas	62	Tetanus	3
Influenza	27	Trachoma	45
Leprosy	2	Tuberculosis (respiratory)	282
Lethargic encephalitis	4	Typhoid fever	45
Malaria	1	Whooping cough	362
Measles	3		

SWEDEN

Notifiable diseases—July 1937.—During the month of July 1937, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	6	Poliomyelitis	[1] 116
Diphtheria	18	Scarlet fever	865
Dysentery	21	Syphilis	22
Epidemic encephalitis	1	Typhoid fever	17
Gonorrhea	1,164	Undulant fever	14
Paratyphoid fever	54	Weil's disease	3

[1] Includes 8 cases nonparalytic at time of notification.

YUGOSLAVIA

Communicable diseases—4 weeks ended August 15, 1937.—During the 4 weeks ended August 15, 1937, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	77	2	Poliomyelitis	18	2
Cerebrospinal meningitis	8	1	Scarlet fever	246	3
Diphtheria and croup	567	24	Sepsis	8	2
Dysentery	455	34	Tetanus	55	19
Erysipelas	209	4	Typhoid fever	612	52
Measles	50	3	Typhus fever	19	
Paratyphoid fever	102	2			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan-American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	Week ended— June 1937: 5	June 12	June 19	June 26	July 1937: 3	July 10	July 17	July 24	July 31	August 1937: 7	Aug. 14	Aug. 21	Aug. 28
China:																		
Canton	C												22	40	32	48		
Hoihow	C											160						
Hong Kong	C													11	51	205	558	390
	D													11	20	86	133	205
Kwangchow Wan	C														7			
Macao	C															35	108	86
Shanghai	C																	8
Swatow	C																4	
Federated Malay States	C									2								
India	C	7,736	13,015	17,023	14,149	3,219	3,050	2,508	2,336	2,007	2,503	2,633	3,122					
	D	4,305	6,488	8,324	7,366	1,611	1,526	1,179	1,138	1,019	1,186	1,196	1,410					
Assam	C	197	394	1,823	2,554	258	104	49	24	13	21	14	9	6		8		
	D	80	161	728	1,205	162	72	30	10	7	8	12	5	2		6		
Bassein	C	8	37	86	97	2	3	1					1					
Bombay Presidency	C	253	98	557	3,259	583	451	334	345	288	406	474	840		1,281			
	D	142	84	237	1,457	209	183	146	136	122	136	180	304		580			
Bombay	C			[1] 1	[1] 2							[1] 1						
Calcutta	C	87	106	247	732	86	31	35	21	13	17	21	26	15		18		
Central Provinces and Berar	C		4	5	83	50	97	123	48	16	22	13		11	32	45		
Chittagong	C	2	3	13	143	21	7	6		[1] 1	3		[1] 1					
Madras Presidency	C	4,516	3,186	3,270	1,839	629	419			332	449	605	680					
	D	2,514	1,559	1,855	1,103	331	213			159	183	250	273					
Madras	C	25	5	5	1	3	2	1				1	1	14		7		
	D	14	1	1		1	2						1	5		5		
Negapatam	C	4	2		2	3			17									
	D	1				2			10	1								
Northwest Frontier Province	C															100		
Orissa Province	C	609	602	368	181		39	73	76	62	56	59	60	58	42	71		
Punjab	C		1	2	3		3	6	7	6	10	4		4	17			
Rangoon	C	4	3	6	12	[1] 1	[3] 4	1	1									
Sind State	C				1											1		
Tuticorin	C				2	4	6											

Place																		
India (French):																		
Chandernagor Territory	C		3	5	8	2				1	1							
Karikal Province	C	16	3															
Pondichery Province	C	13	1		1													
Indochina (see also table below) · Cochinchina—																		
Chaudoc	C		P															
Cholon Province	C			P														
Philippine Islands: Manila	C			1														
	D			1														
Siam:																		
Bangkok	C	163	226	948	338	13	9	4	2		1	1	2					
Provinces	C	1,339	1,485	1,646	796	50	72	81	52	36	55	35	13	7	12	16	10	
Straits Settlements: Penang	C							1										
On vessels:																		
S. S. *Kedah* at Singapore from Penang	C			1														
S. S. *Hellas* at Bangkok from Swatow	C			3														
	D			2														
S. S. *Kedah* at Belawan-Deli	C			1														
S. S. *Ellenga* at Penang from Negapatam	C					15												
	D					9												
S. S. *Aronda* at Rangoon from Calcutta	C					1												
S. S. *Badahur* at Rangoon from Calcutta	C						1											
S. S. *Talamba* at Port Swettenham from Madras	C									2								
S. S. *Chungking* at Bangkok from Hoihow	C											1						
S. S. *Hiangsu* [3] at Singapore from Hong Kong	C												1					
S. S. *Kwantung* at Hong Kong from Hoihow	C												1					
S. S. *Eagle* at Hong Kong from Kongmoon	C													1				
S. S. *Muinam* at Singapore from Hong Kong	C																2	
	D																1	
S. S. *Sandviken* at Hong Kong	C																P	
S. S. *Haiching* at Hong Kong	C																P	

Place		December 1936			January 1937			February 1937			March 1937			April 1937			May 1-10, 1937
		1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31	1-10	11-20	21-30	
Indochina (French) (see also table above)																	
Cambodia [4]	C	1									2	6			2		3
	D	1									2	6			2		1
Cochinchina [4]	C		1				1				2				1		
	D		1				1				2				1		

[1] Imported.
[2] Includes 3 imported cases.
[3] In addition for week ended July 28, 1937, 3 cases of cholera with 2 deaths in contacts.
[4] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE[1]

[C indicates cases; D, deaths; P, present]

Place		Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Mar. 28–Apr 24, 1937	Apr. 25–May 29, 1937	Week ended— June 1937: 5	12	19	26	July 1937: 3	10	17	24	31	August 1937: 7	14	21	28
Algeria: Algiers	C										[2] 1							
Argentina. (See table below.)																		
Bolivia. (See table below.)																		
Brazil. (See table below.)																		
British East Africa:																		
Kenya	C	7	4	5	7		2	3	19	18	7	10	2	5	4			
Tanganyika	C	84	10	29	11	3	2	1							1			
Uganda	C	32	41	24	48	6	8	12	13	8	16	6	10	7				
	D	32	35	22	43	5	8	12	13	8	14	6	8	7				
Ceylon:																		
Central Province—Nuwara Eliya District	C						1											
Chilaw District	C				1													
Colombo	C	10	6		2	1		1										1
	D	9	6		2	1		1										1
Plague-infected rats		17	3	2	1	1	2			1				1				
China:[3]																		
Amoy	C			2														
Fukien Province[3]	D			130														
Hainan Island	C		P															
Hsiatangchi.[3]																		
Dutch East Indies:																		
Java and Madura	C	568	443	259	260													
	D	559	443	255	255													
Java—Batavia	C			1														
Ecuador (see also table below):																		
Babahoyo	C	1																
Guayaquil	C	26	33	17	8			4									1	
	D	11	24	16	3			1	2	1							1	
Plague-infected rats		16	33	37	27	6	5	2			1			1		2		
Egypt:																		
Asyut Province	C	1	2	48	9	1												
Dakahliya Province	C			1														
Girga Province	C		1	1	3				1									

Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua District:																		
Hamakua Mill Sector [4]			1													5	2	1
Honokaa Sector													1	2				
Paauhau Sector [4]		6	5	4	4			3	4		1							1
Pohakea			1															
India	C	4,931	5,960	6,094	2,502	112	65	72	67	58	120	118	126					
	D	2,528	2,976	3,467	1,690	65	55	39	44	36	71	89	87					
Bassein	C	7	5	8	7		3		3			1				2		
Plague-infected rats		1	2	2	2		1	1						1				
Bombay Presidency	C	120	83	68	35	10	3	7	4	3	5	14	11		8			
	D	62	40	37	16	3	1	3	2	3	2	10	5		9			
Central Provinces and Berar	C	1,614	2,213	1,103	363			7			10					8		
Karachi	C	7	3	5	1													
Plague-infected rats				1														
Madras Presidency	C	94	97	53	23	2	4			6	22	24	27					
	D	57	54	30	12	1	2			7	9	14	19					
Punjab	C		1	1	2											17		
Rangoon	C	1	1	3	2						[5] 1		[5] 1			2	3	
Sind State	C	6	4	6	2													
Indochina (see also table below):																		
Pnom-Penh	C								1									
Sadec	C										1							
Madagascar. (See table below.)																		
Malta	C			1	4													
Northern Rhodesia	C	1																
Peru. (See table below.)																		
Senegal:																		
Dakar	C			1		1					1							
Thies	C				2	1		2	1									
Tivaouane	C				1						1							
Syria: Ras el Ain region	D					[6] 12												
Tunisia: Tunis	C				1							1	1					
Plague-infected rats				17	5						1							
Union of South Africa (see also table below)	C	4	3	[7] 1														

[1] Including plague in the United States and its possessions.
[2] Suspected
[3] Plague has been reported in China as follows Information dated Aug 18 reports an outbreak in West Hsingan (Khingan) and Southern Lungkiang Provinces. Under date of June 1, estimated deaths from plague in Fukien Province reported to be 3,000 to 4,000. According to a report dated May 10 several hundred deaths from bubonic plague occurred in Hsiatangchi.
[4] Plague has also been reported in Hawaii Territory, Island of Hawaii, Hamakua District, as follows: Week ended Aug. 14, 1 lot of 5 rats and 1 lot of 3 mice, by mass innoculation, and week ended Sept. 4, 3 plague infected rats, all in Hamakua Mill Sector, also week ended Sept. 4, 1 plague infected rat in Paauhau Sector.
[5] Imported.
[6] Pneumonic plague.
[7] For 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place	Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	Week ended— June 1937				July 1937					August 1937			
					5	12	19	26	3	10	17	24	31	7	14	21	28
United States: [8]																	
California: [8] [9]																	
Fresno County.[9]																	
Placer County—Plague infected fleas.																	
San Bernardino County—Plague infected fleas.																	
San Mateo County—Plague infected fleas, lice, and ticks.																	
Idaho: [8] Bannock County—Plague infected ground squirrels								(10)									
Montana:																	
Beaverhead County—Plague infected ground squirrel												1					
Madison County—Plague infected squirrels																1	1
Nevada: [8]																	
Douglas County C						1											
Ormsby County—Plague infected fleas and lice.																	
Oregon: [8]																	
Grant County—Plague infected ground squirrel				1													
Lake County—Plague infected fleas.																	
Wallowa County—Plague infected ground squirrels				1				1									
Utah: [8]																	
Morgan County—Plague infected fleas.																	
Wasatch County—Plague infected ground squirrels																1	
Washington: [8] Adams County—Plague infected fleas and lice.																	
On vessel: S. S. *Magister* at Kingston from Maranhao, Para, and Manaos C		1															

Place		February 1937	March 1937	April 1937	May 1937	June 1937	July 1937
Argentina:							
Cordoba Province	C		1				
Mendoza Province	C						[11] 9
Santiago del Estero Province	C						[11] 6
Bolivia:							
Chuquisaca Department	C	5		[11] 2			
La Paz Department	C				[11] 2	[11] 2	
Oruro Department	C			[11] 1			
Potosi Department	C		[11] 3	[11] 1			
Brazil:							
Parahyba State	C	1					
Pernambuco State	C	2					
Ecuador (see also table above):							
Manabi:							
Bahia	C	4	7	2			
Manta	C	8	12	13			

Place		February 1937	March 1937	April 1937	May 1937	June 1937	July 1937
Indochina (see also table above):							
Cambodia	C		1	4	4	4	2
Cochinchina	C						2
Madagascar (central region)	C	[12] 219		57	45	23	
	D	199		57	43	22	
Peru	C	23	28	9	12	4	7
Cajamarca Department	C		1				
Huancabamba Department	C			3			
Lambayeque Department	C	4		1	1	1	1
Libertad Department	C	12	12	4	3	2	4
Salaverry	C						3
Lima Department	C	5	1	1	2	1	2
Lima City	C	1					
Piura Department	C	2	14		6		
Union of South Africa (see also table above)	C	3	3	1			

[8] Plague infection proved in insect hosts as follows *California*—Placer County, June 22: San Bernardino County, July 12–29: San Mateo County, July 1937. *Idaho*—Bannock County, July 8. *Nevada*—Douglas County, July 29–31; Ormsby County, July 2–Aug. 20. *Oregon*—Lake County, May 7; Wallowa County, June 25. *Utah*—Morgan County, reported Aug. 10. *Washington*—Adams County, Apr. 29, 1927.

[9] During the week ended Sept. 4, 1 fatal case of plague was reported in Fresno County, Calif.

[10] Number unspecified.

[11] Pneumonic plague.

[12] Includes 66 cases of pneumonic plague.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	Week ended— June 1937				July 1937					August 1937			
						5	12	19	26	3	10	17	24	31	7	14	21	28
Algeria:																		
Algiers Department	C				1		1	1										
Oran Department	C		2		3		1											
Southern Territories	C			2														
Angola. (See table below.)																		
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		
Brazil:																		
Bahia (alastrim)	C	7	6	15	10		1	1		2	1							
Porto Alegre (alastrim)	D			3	1				1		1							
Recife (alastrim)	C	1	3	1														
British East Africa:																		
Kenya	C				1									116				
Tanganyika	C	122	55	72	93		57			65								
Canada:																		
Alberta	C	[1] 46		[1] 1		[1] 1				[1] 1		[1] 3						
Manitoba	C		[1] 1															
Saskatchewan	C	[1] 1																[1] 1
Ceylon: Colombo	C	1																
China:																		
Amoy	C		3	2	1			1										
Canton	C	4	3	4	2													
Dairen	C	6	4	8	2			2	3	1				1				
Foochow	C	P	P	P	P	P		P		P		P		P				
Hangchow	C	3	1	3	1						1							
Hankow	C	5	8	11	11	2	2											
Hong Kong	C	5	7	32	16	4	3			1		2		6	3	2	76	
Macao	C		2															
Nanking	C	7	7	3	1		1	1	2									
Shanghai	C	127	96	55	54	3	6	6	3	10	8	2	8	1	1			
Swatow	C		3	4	5		1	1										
Tientsin	C	11	5	3	7	1	2		1									
Chosen. (See table below.)																		
Colombia (see also table below): Barranquilla	D	3	2	1		1			1				1					
Dahomey. (See table below.)																		

Ecuador: Guayaquil	C	33	73	34	31	20	8	14	6	4	13	9	4	7	6	2	7	5
Egypt:																		
Port Saïd	C			4					1					1				
Qena Province	C		1															
Eritrea	C	3	103	4	1		2		1			2						
Estonia	C			2														
Finland. (See table below.)																		
France. (See table below.)																		
Gambia:																		
Bathurst	C		[2] 4															
MacCarthy Island	C		4															
Great Britain: England and Wales—																		
Derby	C		2															
Ripley	C		1															
Greece: Salonika	C	15	18	30	37	5					12	12						
Guatemala. (See table below.)																		
Honduras: Puerto Castilla	C			1														
India	C	13,761	12,592	12,022	10,906	2,629	2,695	2,168	1,755	1,561	1,374	1,469	1,178					
	D	3,219	3,005	2,557	2,689	755	764	636	570	442	434	398	337					
Assam	C	220	163	204	384	71	54	65	48	15	25	15	31	21	21	33		
Bombay Presidency	C	905	782	1,147	1,178	194	98	114	130	82	68	102	79		39			
	D	146	136	198	228	39	20	24	37	35	19	35	17		17			
Bombay	C	49	63	136	165	24	18	23	40	27	22	27	15	13		7		
	D	29	48	68	105	16	13	17	26	19	16	16	7	11		7		
Calcutta	C	86	87	57	106	6	4	8	3	2	4	5		3		2		
	D	34	68	51	47	5	4	8	2	2	2	3		3		3		
Central Provinces and Berar	C	299	341	505	452	35	65	73	29	17	42	35	22	37	33	5		
Chittagong	C	208	55	12	1	[2] 2				1	1							
Cochin	C			47	3													
Delhi	C											2	7	3	4			
Karachi	C	49	40	28	19	4		1		1	1							
Madras Presidency	C	579	632	569	483	75	55			69	81	103	106					
	D	84	118	89	98	18	13			18	24	24	26					
Madras	C	37	24	24	49	8	8	11	16	19	14	14	27	21		26		
Moulmein	C	64	48	8			[2] 1											
Northwest Frontier Province	C	85	55	49	30	16	6	19	5	32	33	74	9	23	12	25		
Orissa Province	C	1,049	848	766	618		199	122	136	77	131	74	114	66	93	63		
Punjab	C	490	552	400	513	251	95	159	169	174	140	90	64	92	57			
Rangoon	C	14	5	9	3				1							[2] 1		
Sind State	C	184	143	263	188	40	52	57	105	65	41	75	56	42	86	43		
Vizagapatam	C	3	1															
India (French): Chandernagor Territory	C		2															
Indochina (see also table below):																		
Pnom-Penh	C			1	1			1										
Saigon-Cholon	C	2												1				
Tourane	C	3	4	3														
Iran	C	10		2				1	1									
Teheran	C	2	2		1													
Iraq	C	1		14	2							1		1	4			
Baghdad	C				1													

[1] For 2 weeks.
[2] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	Week ended— June 1937: 5	12	19	26	July 1937: 3	10	17	24	31	August 1937: 7	14	21	28
Italian Somaliland	C											1						
Japan:																		
Kobe	C		[2] 1															
Moji	C		1	10	3													
Osaka	C			1			[2] 1											
Yokohama	C	1		1														
Mexico (see also table below):																		
Chihuahua	C	3									1							
Ciudad Juarez	D											1						
Durango	D	1	10	8	5		2		2					1				
Guadalajara	D			1	2	1												
Mazatlan	C							1		1								
Mexico, D. F.	C	4	4	10	36						6		3	1				
Monterrey	C	11	1	3	1							1				1		
San Luis Potosi	D				1													
Torreon	C	7	1	11	22	2	4		6	3	4					1	1	1
Morocco. (See table below.)																		
Nicaragua: Puerto Cabezas	C	2																
Nigeria	C	19	406	188	281		69		42		84							
Lagos	C	1		1														
Nyasaland. (See table below.)																		
Palestine. (See table below.)																		
Poland	C	1																
Portugal (see also table below):																		
Lisbon	C	1	2	1	1	3	1		2	5			1					
Oporto	C	1							1	1								
Salvador. (See table below.)																		
Senegal. (See table below).																		
Siam: Tak Province	C	26	1	7			2	1		1			2					
Sierra Leone	C	12			2	1												
Freetown	C	1																

Southern Rhodesia	C			1														
Sudan (Anglo-Egyptian)	C	75	12	2	13		33	1	5	6			2		2		3	1
Tunisia	C	105							4									
Turkey. (See table below.)																		
Unfederated Malay States: Kedah	C												P					
Uruguay	C	1					2	1										

On vessels:

S. S. *Colorado Springs* at Manila from Shanghai	1 case	Feb. 1, 1937
S. S. *Nikko Maru* at Moji from Tsingtao	1 case	Feb. 7, 1937
S. S. *Bhadravati* at Bombay from Vengurla	1 case	Feb. 18, 1937
S. S. *Nagasaki Maru* at Nagasaki from Shanghai	1 case	Mar. 8, 1937
S. S. *Kiangsu* at Swatow from Bangkok	1 case	Mar. 13, 1937
S. S. *Sumatra* at Calcutta	2 cases	Mar. 21, 1937
S. S. *Englestan* at Rangoon from Chittagong	1 case	Mar. 25, 1937
S. S. *Dariken* at Hong Kong	1 case	Mar. 31, 1937
S. S. *Talma* at Hong Kong	1 case	Apr. 1, 1937

On vessels—Continued.

S. S. *Jalagopal* at Rangoon from Chittagong	1 case	Apr. 2, 1937
S. S. *Taksang* at Hong Kong	1 case	Apr. 13, 1937
S. S. *President Hoover* at Yokohama from Honlulu	1 case	Apr. 17, 1937
S. S. *Hydri* at Karachi	1 case	Apr. 24, 1937
S. S. *G. G. Pasquier* at Singapore from Saigon	1 case	May 7, 1937
S. S. *Changte* at Thursday Island	1 case	June 26, 1937
S. S. *Empress of Japan* at Kobe from Manila	1 case	Aug. 11, 1937
S. S. *Northern Prince* at New York from Rio de Janeiro	1 case	Aug. 19, 1937
S. S. *Empress of Asia* at Honolulu	1 case	Sept. 5, 1937

Place		February 1937	March 1937	April 1937	May 1937	June 1937	July 1937
Angola	C	11	9				
Belgian Congo	C	158	283	143	287		
Bolivia	C	4	5	25	48		
China: Manchuria—Harbin	C		3	11	4		
Chosen	C	41	58	73	27	1	
Colombia (see also table above)	C	35	42	89	51	108	
Dahomey	C		5	2			
Finland	C	1					
France	C		1	1	1		
Guatemala	C	2				2	
Indochina (see also table above)	C	382	505	316	274	273	
	D	70	97	46	95	50	
Mexico (see also table above):							
Aguascalientes State—Aguascalientes	C	1		1	1		
Chihuahua State	C			1	2		
Colima State	C	2		4			
Jalisco State—Guadalajara	C	1		1		1	
Mexico—Continued:							
Mexico State	C		1		1		
Mexico, D. F.	C		16	13	41	28	
Mexico City	D	2					3
Nuevo Leon State—Monterrey	C	6					
Queretaro State	C		3	1	10	8	
San Luis Potosi State—San Luis Potosi	C	1		1		1	
Morocco	C	6		6	1	1	4
Nyasaland	C	7		3			
Palestine	C	8					
Portugal (see also table above)	C	59	27	15	29		
	D	6	2	5	1		
Salvador	C			4			
Senegal	C			29	28	37	
Turkey	C			15	4	1	

[2] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Week ended— May 1937 1	8	15	22	29	June 1937 5	12	19	26	July 1937 3	10	17	24	31	August 1937 7	14
Algeria:																				
Algiers Department	C	128	84	96	17	14	30	9	8	2	27	47	3	15	8	34		[1] 140	4	
Algiers	C	2	3	4	1		1	2			1	1		1	5	5		[1] 62	2	
Constantine Department	C	139	225	348	98	47	92	71	109	115		68	33	65	46	23		[1] 69	16	
Bone	C	10	3	4	1			4	1	11						3		[1] 12	4	
Constantine	C															3		[1] 19	7	
Philippeville	C		1		1													[1] 1		
Oran Department	C	64	72	24	1	3			6	8	9	9		4		6		[1] 6	6	
Southern Territories	C	9	[2] 2	1					2	1	5	3		3	1					
Arabia: Aden	C		1																	
Australia: Sydney	C		1					1												
Bolivia. (See table below.)																				
Chile	C	226	175	154	41				[3] 212				[3] 272							
Concepcion Province	C	18	20	14		1			2		1									
Iquique	C							1			2									
Santiago Province	C	130	69	58	27	23	29	22	12	28	33	31	19							
Valparaiso	C	10	37	39	2	17	13	28	11	30	22	29	24	17	6	13		14	14	8
China (see also table below):																				
Hankow	C										1						1			
Nanking	C					3	1													
Shanghai	C		1			1	2		1	1	2	1		5						
Swatow	C	1												1	2					
Tientsin	C	1	1	1		1	1			1	1	1	3		1					
Tsingtao	C	2		1	7	4	1							1						
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C	9	5	5	4	4	5	3	4	4	1				1	1		4	4	5
Aswan Province	C		7	5	4				2											
Asyut Province	C	2	5							5				1	1	2		2	2	
Beheira Province	C	60	18	53	24		27		23	14				10	7	5		1	1	
Beni-Suef Province	C								1											
Cairo	C	4	11	14	4	4	6	2	1	1										
Dakahliya Province	C	25	15	38	24		35		15	15				14	10	6		1	3	
Damietta Province	C									1	1									
Faiyum Province	C															1				

Gharbiya Province	C	20	12	59	40		56		39	55				17	19	1		4		
Girga Province	C								1	2				1	1					
Giza Province	C															2				
Minufiya Province	C	20	6	11	6		10		9	4					1			3		
Minya Province	C	21					1		1										1	
Port Said	C	1										1		1	1					
Qena Province	C			14	26		6		1	3										
Sharkiya Province	C		1	2	10				1	3					1					
Suez	C											1					1	1		
Provinces	C	175	123	243	144	170	150	149	96	106	59	85	57	45	40	17	15	13	14	6
Eritrea: Asmara	C	1		6	3			1		1	1					1		1		
Finland. (See table below.)																				
Greece. (See table below.)																				
Guatemala. (See table below.)																				
Hawaii Territory: Honolulu	C		1	1										1		1	2			
Hungary	C	7	12					1						1						
Iran	C	19	[2] 1	7		4		7	3	15	1		9							
Teheran	C	3				1				1										
Iraq:																				
Baghdad	C			[3] 5									1	1		1				
Diwaniyeh Province	C					6														
Kirkuk Province	C		12	8		2			1	2	4	6		2						
Kut Province	C			1																
Irish Free State: Kerry County—Cahersiveen	C	4		4																
Latvia. (See table below.)																				
Libya. (See table below.)																				
Lithuania. (See table below.)																				
Mexico (see also table below):																				
Mexico, D. F.	C	20	11	13	4	7	2	3	2								2			
San Luis Potosi	D										1									
Torreon	C			1																
Morocco (see also table below)	C	22	24	120	69	65	70	47	101	49	50	38	37	31	15	13	19	7	7	3
Casablanca	C									200				2				3	3	2
Palestine:																				
Haifa	C	1	1	1	1	1		2	2		1				2		1		1	
Jaffa	C		2	4	1		2	1	2		2	1		1		2			1	4
Panama Canal Zone. (See table below.)																				
Poland	C	485	462	629	158	132	205	199	111	106	76	66	39	30	18	18	13	10	13	
	D	26	33	40	9	11	10	5	8	5	9	4	2			1			3	
Rumania. (See table below.)																				
Sierra Leone: Freetown	C	1				2														
Straits Settlements: Singapore	C											1								
Switzerland: Zurich	C														1					
Syria	C			1																
Trans-Jordan	C	3	1	3	3				2						1					

[1] For 2 weeks.
[2] Imported.
[3] For 4 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Week ended— May 1937					June 1937				July 1937					August 1937	
					1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14
Tunisia:																				
Tunis	C	5	4	4	2	3	9	1	5	3	9	2	5	1	1	1		1	2	6
Provinces	C	247	550	428	90	166	133	136	141	93	188	139	126	87	97	106		47	57	
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia. (See table below.)																				
On vessel: At Santos	C		P																	

Place		February 1937	March 1937	April 1937	May 1937	June 1937	July 1937
Bolivia	C	25	30	48	39	35	
China: Manchuria—Harbin	C	35	58	45	29	35	
Chosen	C	149	154	147	99	85	
Czechoslovakia	C	12	33	25	3		
Finland	C			1		1	
Greece	C	2	4	2	1	11	
Guatemala	C	19	4	13	12	8	16
Latvia	C		1	1			
Libya	C				13	34	10
Lithuania	C	10	23	37	6	2	7
Mexico (see also table above):							
Aguascalientes State: Aguascalientes	C	3	1	1	2		
Guanajuato State	C		2		4		
Hidalgo State	C			5	1	2	
Jalisco State—Guadalajara	D		1				
Mexico State	C		1		2		
	D		1				
Mexico, D. F.	C	18	12	16	14	14	
Mexico City	D	6					5
Mexico—Continued.							
Oaxaca State	C	2					
Puebla State: Puebla	C	3					
Queretaro State	C	2	1	1	2	2	
San Luis Potosi State: San Luis Potosi	C		2	2	2		
Morocco (see also table above)	C	22	27	190	283	182	89
Panama Canal Zone	C				2		
Rumania	C	1,018	917	832	557	177	
Turkey	C	50	68	39	155	72	30
Istanbul	C	3		3		3	2
Union of South Africa:							
Cape Province	C	12	38	41	35	12	
Natal	C	1	1		7	13	
Orange Free State	C	11	5	3	27	35	
Transvaal	C	1	2		1	3	
Yugoslavia	C	125					

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Jan. 31–Feb. 27, 1937	Feb. 23–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Week ended— May 1937 1	8	15	22	29	June 1937 5	12	19	26	July 1937 3	10	17	24	31	August 1937 7	14	21	28
Brazil:[1]																						
Acre Territory	D	1																				
Matto Grosso State [1]	C	20	1																			
	D	6	3		2	1								1								
Minas Geraes State [1]	C	2																				
	D	13	34	13	1																	
Para State [1]	D			1										2	1	1		2				
Paraná State	C	2																				
Piauhy State	D									1												
São Paulo State [1]	C	1																				
	D	14	38	16																		
Colombia:																						
Barrancabermeja	C	1																				
Boyaca Department	C								1			1		2								
	D	1	1						3							2	2					
Cundinamarca Department	D									1		1										
Intendencia of Meta—Villavicencio	D		1	3																		
Santander Department	C	1																				
	D	1		2		1		1						1								
Dahomey: Bohicon	C												1									
French Equatorial Africa:																						
Brazzaville	D			1																		
Libreville	C		1															1				
	D	1																1				
Gold Coast [2]	C	3	1			2			2		6	3	2	5		10	2	6	6	2		1
	D								1		6	3	2	4		10	2	3	4			
Accra	C	3										1	1	1		1						1
Nugo	C								1													
Ivory Coast:																						
Adzope	C	3																				
Agboville	C		1																	1		

[1] See also reports of yellow fever in Brazil on pp. 463, 536, 657, 683, 762, 818, 912, 1134, and 1248 of the Public Health Reports.
[2] During the week ended Sept. 11, 2 cases of yellow fever with 1 death were reported in Gold Coast, including 1 suspected case in Accra.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Jan. 31–Feb. 27, 1937	Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Week ended—																	
					May 1937					June 1937				July 1937					August 1937			
					1	8	15	22	29	5	12	19	26	3	10	17	24	31	7	14	21	28
Nigeria:																						
Aba	C																				1	
Farcados	C																1					
Ibadan	C																	1				
Ogbomosho	C													3	1		1					
	D													1			1					
Ovim	C																	1				
	D																			3		
Sapele	C																					1
Paraguay [3]	C														P							
Peru: Perene region (Pampa Whaley)	C			[4] 23																		
	D			8																		
Senegal:																						
Bambey	C												[5] 1									
Dakar	C						[5] 1															
Diakhao	C		1		1																	
Diourbel [6]	D																				1	
Gossas	C																					1
Malem Hodar	C								1													
Tamba-Counda	C																				[5] 1	
Thies Circle—Khombole	C			1																		
Tilmaka	C			1				1														
Tivaouane	C			1																		
Sudan (French): Mahina	C					[5] 1																

[3] A dispatch dated June 4, 1937, from the United States legation in Asuncion, Paraguay, states that yellow fever has been officially reported in the northwestern part of Paraguay.
[4] Jungle type.
[5] Suspected.
[6] During the week ended Sept. 4, 1 case of yellow fever was reported in Diourbel, Senegal.

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UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 52 **OCTOBER 1, 1937** **NO. 40**

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

August 15–September 11, 1937

The accompanying tables summarize the prevalence of eight important communicable diseases based on weekly telegraphic reports from State Health Departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of Disease." Table 1 gives the number of cases of poliomyelitis reported by each State in recent weeks of 1937 and in corresponding weeks of 1936, 1935, and 1934, and table 2 gives the number of cases of eight important communicable diseases, including poliomyelitis, for the 4-week period ending September 11, the number reported for the corresponding period in 1936, and the median number for the years 1932–36.

DISEASES ABOVE MEDIAN PREVALENCE

Poliomyelitis.—A total of 6,407 cases of poliomyelitis has been reported since the first of January, as compared with 2,036 and 7,278 during the same period in 1936 and 1935, respectively. The number of cases is more than three times that of last year, when the prevalence was confined mostly to the East South Central region, but did not reach the level of 1935, when the disease was epidemic at this time in States along the Atlantic Coast, nor that of 1931 (10,193 cases), when a more severe epidemic was in progress in the North Atlantic regions. In 1934 and 1933 the numbers of cases for this period totaled 5,290 and 3,038. In 1934 the disease was epidemic in California and other western States; in 1933 a minor outbreak occurred in the North Atlantic regions; and in 1932, with a total of 2,446 cases, not considered epidemic, the highest incidence was also reported from the North Atlantic States.

Table 1 shows for each State the number of cases of poliomyelitis reported since the beginning of the current year, with comparative data for the corresponding period in the 3 preceding years. It includes also the weekly number of cases in each State for recent weeks of 1937.

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TABLE 1.—*Poliomyelitis cases reported in each State during recent weeks of 1937* [1]

Division and State	37 weeks ended— Sept. 15, 1934	Sept. 14, 1935	Sept. 12, 1936	Sept. 18, 1937	Cases reported in 1937 for week ended— July 10	July 17	July 24	July 31	Aug. 7	Aug. 14	Aug. 21	Aug. 28	Sept. 4	Sept. 11	Sept. 18
All States [2]	5,290	7,278	2,038	6,407	253	275	324	401	409	455	492	622	641	817	879
New England:															
Maine	11	67	28	93	2	0	4	8	13	8	6	8	19	12	16
New Hampshire	8	37	3	16	0	1	1	2	0	1	1	5	4	0	1
Vermont	8	12	9	19	0	1	0	0	0	2	3	5	0	1	6
Massachusetts	54	869	45	298	3	2	10	13	12	25	41	51	44	44	41
Rhode Island	1	197	2	11	0	0	0	0	1	2	0	1	3	0	4
Connecticut	18	246	6	63	2	0	0	2	3	8	6	7	10	13	16
Middle Atlantic:															
New York	155	2,090	128	437	6	10	8	10	17	22	39	64	52	91	91
New Jersey	54	258	20	92	1	1	1	5	3	6	14	8	10	13	21
Pennsylvania	82	120	61	185	0	1	0	6	11	14	21	22	19	37	40
East North Central:															
Ohio	144	71	72	431	9	14	20	48	38	45	22	50	31	66	59
Indiana	35	21	16	113	1	8	7	15	7	8	12	7	11	18	10
Illinois	136	136	195	552	2	8	11	26	28	82	54	46	106	180	81
Michigan	114	421	45	271	1	2	4	10	14	24	21	81	34	49	57
Wisconsin	46	46	14	133	1	0	2	2	6	10	6	13	23	19	45
West North Central:															
Minnesota	49	43	11	149	0	1	1	1	9	5	10	14	18	30	52
Iowa	20	33	22	126	0	1	3	3	4	8	7	14	16	26	35
Missouri	22	24	25	247	22	4	16	16	16	16	13	29	25	36	47
North Dakota	6	5	6	5	0	0	0	0	0	0	0	0	3	1	0
South Dakota	25	5	6	17	0	0	0	0	1	0	1	0	5	4	3
Nebraska	11	9	11	147	0	4	4	11	7	14	15	19	19	27	18
Kansas	45	16	25	144	3	4	4	7	13	13	13	15	14	20	30
South Atlantic:															
Delaware	3	5	1	7	1	0	0	0	0	0	0	1	0	5	0
Maryland	18	59	9	61	0	0	1	7	3	13	5	7	6	11	7
District of Columbia	6	55	2	17	0	0	0	1	0	1	3	3	4	0	2
Virginia	51	635	36	49	3	3	1	5	4	4	1	2	[illegible]	3	5
West Virginia	55	34	21	53	0	2	1	4	12	1	5	7	4	2	2
North Carolina	35	598	37	86	4	8	9	6	4	6	5	4	8	1	4
South Carolina	10	26	16	21	0	1	1	1	1	2	0	1	0	1	1
Georgia	12	14	52	63	6	4	3	2	6	0	5	4	2	0	5
Florida	14	14	16	25	0	0	0	1	0	2	3	1	2	4	1
East South Central:															
Kentucky	76	214	47	113	7	5	18	33	9	2	4	4	8	4	4
Tennessee	38	62	224	98	11	7	10	6	3	1	1	5	2	8	1
Alabama	38	48	355	60	4	1	1	1	3	4	2	4	5	7	3
Mississippi	18	9	93	241	20	20	13	13	8	11	11	8	10	10	4
West South Central:															
Arkansas	11	14	6	282	36	36	48	26	16	19	10	7	6	12	9
Louisiana	13	79	17	95	8	7	7	5	7	8	6	4	4	7	8
Oklahoma	9	10	8	355	55	46	53	28	30	23	19	25	9	14	19
Texas	79	59	24	522	36	52	31	42	58	45	51	34	36	21	33
Mountain: [2]															
Montana	235	5	9	17	1	0	1	0	2	1	3	1	3	1	4
Idaho	97	1	12	6	0	0	0	0	0	0	0	0	1	0	0
Wyoming	4	1	2	29	0	1	1	1	2	6	0	10	0	2	5
Colorado	18	7	18	129	0	1	8	2	2	8	21	28	20	21	21
New Mexico	12	5	7	17	1	0	2	0	0	2	1	1	0	1	3
Arizona	88	12	8	17	2	0	2	1	0	0	0	2	1	2	3
Utah	7	5	2	14	0	0	0	0	0	1	0	1	2	5	4
Pacific:															
Washington	435	24	34	31	0	0	0	0	1	0	3	5	1	2	10
Oregon	35	8	14	32	0	0	1	1	2	1	3	0	2	4	2
California	2,839	554	221	418	8	19	21	34	33	36	25	44	38	37	46

[1] A similar table appeared in the PUBLIC HEALTH REPORTS for Sept. 3, 1937, p. 1208.
[2] Exclusive of Nevada, from which State no reports are received.

As this disease is usually most prevalent during the months of August and September, more than 4,000 of the 6,407 cases reported to date this year occurred during the 8 weeks ending September 11. Later reports (week ending Sept. 18) show a total of 879 cases—the highest weekly incidence reported this year. The current epidemic

started in the West South Central region, spread into the North Central regions and then to the Atlantic coast areas. During this period 117 cases were reported from Colorado and 268 from California, but other States in the western regions have reported only about the usual seasonal incidence. The Middle Atlantic region is low in relation to the preceding 5-year median, but all other regions show considerable excesses.

Measles.—The incidence of measles (2,972 cases) was about 60 percent above that (1,861 cases) for the corresponding period in 1936 and was also considerably above the average for the season. Each region except the New England and Pacific regions reported an increase over last year, but the disease appeared to be unusually prevalent in the Middle Atlantic, East North Central, and South Central regions.

Meningococcus meningitis.—The meningococcus meningitis incidence (216 cases) stood approximately at the 1936 level. For this period in 1935, 1934, and 1933 the numbers of cases totaled 268, 129, and 129, respectively. The number of cases reported from the South Atlantic and South Central regions was somewhat above the seasonal expectancy, but in all other regions the incidence was about normal.

Smallpox.—Smallpox still maintained a relatively high level. For the 4 weeks ending September 11 there were 222 cases reported, as compared with 141, 117, and 70 for the corresponding period in the years 1936, 1935, and 1934, respectively. The Central and Western regions have been almost entirely responsible for the high incidence of this disease that has prevailed during the past 3 years, while the Atlantic coast regions have been practically free from the disease.

DISEASES BELOW MEDIAN PREVALENCE

Typhoid fever.—The number of cases (2,467) of typhoid fever, although slightly above the low record of 2,355 cases reported for this period in 1936, was well below the usual seasonal incidence. The increase over last year was due almost entirely to an excess of cases in the East North Central and West South Central regions. Compared with the preceding 5-year median the incidence of typhoid fever was low in the country as a whole and also in each region except the West South Central and Pacific regions.

TABLE 2.—*Number of reported cases of 8 communicable diseases in the United States during the 4-week period Aug. 15–Sept. 11, 1937, the number for the corresponding period in 1936, and the median number of cases reported for the corresponding period 1932–36* [1]

Division	Current period	1936	5-year median	Current period	1936	5-year median	Current period	1936	5-year median	Current period	1936	5-year median
	Diphtheria			Influenza [2]			Measles [3]			Meningococcus meningitis		
United States [1]	1,468	1,393	2,058	1,193	834	1,279	2,972	1,861	2,385	216	220	160
New England	28	21	62	3	7	6	124	233	204	7	7	7
Middle Atlantic	128	169	198	22	33	30	963	683	730	40	47	38
East North Central	185	201	256	161	93	226	751	213	474	29	37	39
West North Central	78	105	184	167	53	58	139	58	174	19	18	19
South Atlantic	466	317	493	336	225	413	240	225	317	47	41	15
East South Central	232	235	428	57	65	120	243	60	88	28	23	15
West South Central	214	201	400	318	221	176	126	93	93	22	13	8
Mountain	51	39	47	45	62	26	189	78	87	8	21	5
Pacific	86	105	105	84	75	68	197	208	208	16	13	13
	Poliomyelitis			Scarlet fever			Smallpox			Typhoid fever		
United States [1]	2,572	626	1,251	3,450	3,492	3,990	222	141	117	2,467	2,355	3,315
New England	284	17	27	142	212	253	0	0	0	44	40	52
Middle Atlantic	390	69	686	595	727	749	0	0	0	265	297	297
East North Central	749	129	170	1,024	1,098	1,129	28	19	24	464	257	561
West North Central	394	23	69	431	401	401	44	83	15	173	209	248
South Atlantic	111	64	64	303	291	486	0	0	5	434	464	688
East South Central	88	225	70	243	172	276	21	1	2	395	520	664
West South Central	265	13	15	194	114	185	5	1	11	519	393	481
Mountain	127	14	10	214	138	118	71	73	8	78	107	112
Pacific	164	72	72	304	339	335	53	14	28	95	78	78

[1] 48 States. Nevada is excluded, and the District of Columbia is counted as a State in these reports.
[2] 44 States and New York City. The median is for the years 1933–36, only; the data for 1932 are not comparable.
[3] 46 States. Mississippi and Georgia are not included.

Scarlet fever.—This disease continued to maintain a low level in relation to recent years. In the North Central region, where the disease has been unusually prevalent for the past 3 years, the incidence has dropped to a more normal level, and while the South Atlantic and South Central regions reported an excess of cases over 1936, the incidence in each region compared very favorably with that of preceding years. In the Mountain region the number of cases was somewhat above the incidence of recent years but it may be possible that the seasonal increase of this disease that usually occurs soon after the middle of September has begun earlier in that region.

Diphtheria.—The number of cases of diphtheria reported for the current period was 1,468, as compared with 1,393, 2,058, and 1,975 for the corresponding period in the years 1936, 1935, and 1934, respectively. The increase of diphtheria over last year that has prevailed since about the middle of June has been confined largely to the South Central and Western regions. During the current period, however, the incidence in those regions dropped to about the usual level and

the disease appeared to be more prevalent in the South Atlantic region. States in that region reporting a large number of cases were North Carolina (137), Virginia (98), Georgia (95), and South Carolina (43).

Influenza.—The number of cases (1,193) of influenza represented an increase of about 40 percent over the number reported for the corresponding period in 1936, but it very closely approximated the incidence in each of the 3 preceding years. For the country as a whole the current incidence fell slightly below the average of the 4 preceding years; the distribution by geographic regions shows that the incidence in the West North Central and West South Central regions was somewhat above the normal seasonal incidence, while other regions closely approximated the 4-year average or fell below it.

MORTALITY, ALL CAUSES

The average mortality rate for large cities for the 4 weeks ending September 11, based on data received from the Bureau of the Census, was 9.9 per 1,000 inhabitants (annual basis). The rates for the separate weeks were 10.2, 9.8, 10.2, and 9.4. The interruption that occurred in the usual seasonal decline of the death rate during the third week of the period was no doubt mostly due to the heat. During this period cities in the East North Central and Atlantic coast regions showed the largest excesses in mortality.

REDUCING RESIDUAL TYPHOID IN MICHIGAN

Since 1933, the Michigan State Department of Health has been conducting an intensive State-wide effort to eradicate residual typhoid fever, and an interesting report [1] on the third year of the undertaking (1935) has just been made by Dr. Filip C. Forsbeck, of the State bureau of communicable diseases, who has had charge of the work.

The general plan has been to investigate every case of typhoid fever reported in the State and obtain information regarding the source and mode of infection and other important epidemiological data, to examine contacts, and to locate and treat carriers. As Dr. Forsbeck points out, such a thorough follow-up of typhoid fever cases in part-time territory by the State department of health has certain advantages not directly connected with typhoid eradication. It is learned to what extent cases are diagnosed and not reported, to what extent isolation is enforced or how the rules and regulations regarding communicable diseases on dairy farms are ignored.

A new low typhoid fever death rate for the State of 0.69 per 100,000 population was reported for 1935, as compared with 8.1 in 1920 and

[1] *Michigan Department of Health, Lansing.* Typhoid Fever Eradication, 1935. (Mimeographed.)

1.3 in 1934. Improvement in reporting was shown, with a new record of 10.4 cases reported for each death from typhoid—well above the ratio of 8 cases per death given as a perfect score by the American Public Health Association appraisal form. This improvement is stated to be due largely to the follow-up of positive laboratory reports.

Eight outbreaks occurred in 1935, as compared with seven in 1934 and eight in 1933. Three of these outbreaks were traced to carriers (one to a case). The mode or medium of infection was raw milk in two outbreaks, water in one, and undetermined in two. In these latter five outbreaks the cases were associated, respectively, with a club meeting, a store, a cafe, a boarding house, and a thresher's dinner. In the 4 years 1932–35 about one-fourth of the cases occurred in outbreaks and three-fourths were classified as endemic cases. About 10 percent were traced to milk and about 5 percent to water. There has been some decrease in the relative amount of "outbreak" typhoid.

Forty-two carriers were discovered in 1935 as compared with 44 in 1934 and 29 in 1933—119 had been discovered prior to 1935, making a total of 161 by the end of that year. Thirteen carriers became inactive in 1935, leaving a total of 120 active carriers. Forty-one, or 24.2 percent, of all carriers discovered have been transferred to the inactive list, because of death, cure, being lost, or removal to another State. Of course the ultimate objective, with solution of the carrier problem, is to make this 100 percent. It is important to note that for the fifth consecutive year a new high carrier discovery rate was established—11.8 carriers being discovered per 100 cases, as compared with 9.0 in 1934 and 6.4 in 1933. In 1935 a higher percentage of cases (2.5 percent) were found to remain chronic carriers than in any previous year, but it is not known how much of this increase is due to chance and how much to improved administrative and bacteriologic technique. Five carriers submitted to cholecystectomy in 1935, only three of whom were reported cured. A total of 18 cholecystectomies has been performed, of which 16, or 88.8 percent, resulted in cure. No case of typhoid fever has been traced to any of these 18 persons. It is estimated that (on the basis of Michigan's experience of 0.08 case per carrier year) this action has prevented the occurrence of 40 cases and 4 deaths.

It is pointed out that it is exceptional for a patient to have a positive feces report. The specimens may have been obtained either too late or too early, or the case may not have had a positive feces stage. The sound public health practice of insisting on two negative feces release specimens, which is now required, is indicated by the increase in the percentage of cases finally proved to be chronic carriers.

The highest incidence of typhoid fever in Michigan, according to occupation, is found among trained nurses, the rate for the 4-year period 1932–35 being 45 per 100,000 as compared with a rate of 8.9 for the State. Of the cases occurring among nurses in the years 1933–35, only four of the patients had ever been immunized against typhoid fever, and this group includes trainees and graduates of the State's foremost training schools. Of the four nurses who had been immunized, one started treatment the day before onset, one 8 months before, another had been immunized 8 years before, and the fourth at an unknown period.

FURTHER FIELD STUDIES ON THE SELENIUM PROBLEM IN RELATION TO PUBLIC HEALTH

By M. I. Smith, *Principal Pharmacologist*, and B. B. Westfall, *Assistant Chemist, Division of Pharmacology, National Institute of Health, United States Public Health Service*

In a preliminary field survey made to determine the possibility of selenium intoxication in man in selenium-endemic regions, Smith, Franke, and Westfall (*1*) reported finding selenium in the urine of a large percentage of the rural population living on seleniferous soil in sections of Wyoming, South Dakota, and Nebraska. No conclusions could be drawn regarding the significance of those findings, because no definite causal relationship could be discovered between the manifestations of ill-health observed and the occurrence and concentration of selenium in the urine. The more or less characteristic features of so-called "alkali" disease in livestock, which are now believed to be due to selenium poisoning, could not be discerned with reasonable certainty in man; nor was there definite information available concerning the nature or sources of selenium or of the actual amounts absorbed. It appeared necessary, therefore, to make a more detailed and more intensive study, first, of the symptomatology in relation to the amount of selenium excreted, and, second, concerning the most probable sources of selenium to which man may be exposed.

With this object in view a relatively small area of four counties was selected from the much larger area covered by the preliminary survey. This area included three counties, Lyman, Tripp, and Gregory, in South Dakota, and adjacent Boyd County in Nebraska. These four counties, lying immediately west of the Missouri River, had been found, in the course of the preliminary survey, to be the worst area with reference to the occurrence of selenium in the soil, the incidence of so-called "alkali" disease in livestock, and the incidence of relatively high concentration of selenium in human urine. Fifty families which had given evidence of the absorption of consid-

erable selenium in our preliminary field survey in April 1936 were selected for this second investigation, made in September of the same year. Specimens of urine were obtained, usually from two or more members of a family, so as to secure data on the excretion level of selenium in those who presented no symptoms as well as in those who presented suggestive symptoms. In addition, samples of foodstuffs entering directly or indirectly into the dietary of the family group were obtained for analysis. These included drinking water, dairy products, eggs, meats, cereals, and vegetables. Owing to the drought conditions which prevailed during the summer of 1936, vegetables were relatively scarce. The cereal grains produced locally, it was learned, are seldom used for human consumption, but are used largely for animal feed; therefore they usually constitute only an indirect source of selenium to the rural family group.

The analytical procedure used for the determination of selenium in these materials was essentially the same as previously described, based on the distillation of the liberated selenium as the volatile bromide, precipitation by reduction, and quantitative estimation of the colloidal precipitate with the nephelometer (*1*).

The results of this study are shown in the accompanying tables.

Tables 1–A, 1–B, and 1–C summarize the data on the selenium concentration in the urine, the age of the individual, and whatever symptoms appeared worthy of note in 100 subjects representing 50 families. There are several points of interest in connection with these tables. The urinary concentration of selenium appears generally fairly uniform for each family group, irrespective of the age or other conditions of the individuals comprising the family. In only five families, nos. 7, 85, 14, 16, and 60, were there marked individual differences in the urinary concentration of selenium. Neither age nor any other obvious factor would seem to account for it. Whether a mere coincidence or not, it seems strange that in every instance the low values were found in the urines of the female members of the family. Barring the possibility of some differences in degree of diuresis which might easily account for differences in the selenium concentration in the urine, individual peculiarities in dietary habits would seem to be the most probable explanation; for, as will be shown later, some foodstuffs on any given seleniferous farm may carry considerable selenium while others contain little or none.

TABLE 1-A.—*Urinary selenium and symptomatology in 22 families in Lyman County, S. Dak.*

Family		Urinary selenium, micrograms per 100 cc	Age and symptoms
No.	Initials		
22	H. W. B.	21 (28)[1]	55. Icteroid pigmented (chloasma?) skin, bad teeth.
		20	25. History of pulmonary tuberculosis.
23	T. C.	12	31. No definite symptoms.
		30	56. No definite symptoms.
83	H. F. C.	13	50. Bad teeth.
		38 (55)	46. Symptoms of cardio-renal disease.
		40	7. History of recurrent "sick-spells".
		108 [2]	22. History of chronic indigestion.
86	J. D.	43 (23)	14. Sallow, history of chronic indigestion.
		61	44. History of recurrent attacks of indigestion and "biliousness".
90	W. D.	48 (73)	5. No symptoms.
9	J. D.	18	12. Sallow, herpes, subject to carbuncles.
		20	35. Bad teeth.
89	E. D.	88	62. Icteroid skin, bad teeth.
7	A. J. E.	105 (120)	68. Bad teeth, icteroid skin, history of chronic indigestion.
		48 (50)	61. Icteroid skin, bad teeth, symptoms of cardio-renal disease.
85	F. F.	128	42. Chronic indigestion.
		31 (55)	36. Acneiform eruption.
5	B. F.	23	28. Had been jaundiced, was recently operated on for suspected cholecystitis.
		36	14. Sallow.
24	B. H.	20	50. Rheumatoid arthritis.
		30	52. Chronic indigestion.
		36	6. No symptoms.
80	J. H.	33	48. Bad teeth, icteroid skin, chronic indigestion.
		27	15. No symptoms.
109	H. L.	19	58. Icteroid skin.
		54	66. Chronic indigestion, bad teeth.
27	I. M.	29 (26)	12. Sallow, bad teeth.
		56	8. Sallow, acneiform eruption.
12	F. W. M.	40	44. Bad teeth, icteroid skin.
		73	40. Sallow.
		27 (38)	16. Acneiform eruption.
28	L. E. N.	63 (76)	56. No definite symptoms.
91	G. R.	25	42. Bad teeth, rheumatoid arthritis.
		51 (68)	10. Sallow.
		32	13. Sallow.
14	J. F. S.	21	68. Icteroid skin, chronic indigestion (ulcer?).
		49	25. No definite symptoms.
		106	63. Chronic indigestion (ulcer?), bad teeth, icteroid and pigmented (chloasma?) skin.
107	C. J. T.	94	40. Bad teeth, history of chronic indigestion and "bilious attacks".
97	F. H.	25	10. Vitiligo.
		27	7. No symptoms.
		32	11. No symptoms.
106	J. W. R.	25	46. History of chronic indigestion and recurrent jaundice.
108	E. S.	20	48. Icteroid skin and mucous membranes.

[1] Figures in parentheses indicate urinary selenium found in the same individual 5 months previously.
[2] Member of same family, but for past year residing on neighboring farm.

The figures in parentheses in the third column of tables 1-A, 1-B, and 1-C indicate the urinary selenium concentration found in the same individuals 5 months previously. Such data are available for 28 individuals representing 22 families. Analysis of these figures indicates a fairly uniform trend, with relatively little change, suggesting that the absorption of selenium on any given farm at different times of the year remains fairly constant. In 5 of the 28 individuals (families 78, 74, 19, and 46) a rather marked increase in the urinary selenium was noted in September over that found in April. It is probable that had there been more rainfall during the summer and a more abundant supply of garden vegetables there might have been more such differences.

TABLE 1-B.—*Urinary selenium and symptomatology in 18 families, Tripp and Gregory Counties, S. Dak.*

Family		Urinary selenium, micrograms per 100 cc	Age and symptoms
No.	Initials		
70	H. J. D.	34	69. No definite symptoms.
78	W. F.	100 (78)	52. Bad teeth, slightly icteroid skin.
		114 (39)	53. Bad teeth, dermatitis, chronic indigestion.
75	M. K.	46 (25)	50. Atrophic nails, bad teeth, icteroid skin, vitiligo.
		65	48. No symptoms.
74	B. N.	103 (28)	12. Sallow.
		110	23. Bad teeth, icteroid skin.
76	T. T.	43 (65)	52. Icteroid skin, chronic indigestion (duodenal ulcer?).
		73	54. Bad teeth, pathological nails.
16	F. B.	105	59. Icteroid skin, chronic indigestion.
		133 (111)	29. Bad teeth, icteroid skin, chronic indigestion.
		36	55. Icteroid skin.
116	M. O.	23	41. History of recurrent jaundice and chronic indigestion.
		35	47. Bad teeth, sallow.
117	H. C.	43	18. No symptoms.
		53	12. Pallid, recurrent attacks of indigestion.
57	W. DeJ.	65 (73)	14. No symptoms.
		25	10. No symptoms.
62	T. M. D.	35 (32)	15. No symptoms.
		48	5. No symptoms.
21	F. M.	34	19. No symptoms.
		25	65. Bad teeth, icteroid skin, rheumatoid arthritis.
51	H. J.	20	7. No symptoms.
		27 (35)	5. No symptoms.
52	C. K.	26 (53)	5. No symptoms.
19	C. B. K.	198 (80)	51. Icteroid skin, bad teeth, chronic indigestion.
		124 (47)	44. Icteroid skin, chronic indigestion.
64	L. B. L.	64 (45)	4. Pallid.
60	G. P.	35	23. Pathological nails.
		117	6. Pallid
68	G. S.	29	45. Hyperthyroidism.
		34 (24)	60. Bad teeth.
56	L. C. T.	28	11. Bad teeth, sallow.

TABLE 1-C.—*Urinary selenium and symptomatology in 10 families, Boyd County, Nebr.*

Family		Urinary selenium, micrograms per 100 cc	Age and symptoms
No.	Initials		
33	W. D. A.	30	45. Icteroid skin, history of recurrent jaundice.
		35	27. Bad teeth.
113	L. A.	20	36. Chronic indigestion.
		20	33. No definite symptoms.
		24	76. Icteroid skin.
37	C. C.	35	45. Icteroid skin, history of "bilious attacks."
		32	47. Icteroid and pigmented (chloasma?) skin.
34	E. H.	65	35. Icteroid skin, chronic indigestion.
		23	33. History of recurrent attacks of indigestion.
		47	7. Had appendectomy with no apparent benefit.
118	E. H.	64	22. History of chronic indigestion (gastric ulcer?).
47	H. M.	98	35 History of chronic indigestion.
		80	7. Pallid.
		70 (66)	6. Pallid.
46	E. M.	63	34. Icteroid skin, bad teeth.
		88 (38)	12. Recurrent attacks of indigestion, appendectomy with no apparent benefit.
45	H. M.	25	21. No symptoms.
44	J. P.	43 (63)	24. No definite symptoms.
		55	57. Icteroid skin.
38	G. P.	38	22. Sallow, recurrent attacks of indigestion.
		45	33. No symptoms.
		56	62. Bad teeth, icteroid skin, history of recurrent attacks of indigestion with jaundice.

Regarding the symptomatology, the observations detailed in tables 1–A, 1–B, and 1–C may be summarized by saying that the conditions seen in the 100 individuals presented the following frequency:

No obvious symptoms	24
Gastrointestinal disturbances	31
Bad teeth	27
Icteroid discoloration of the skin	28
History of recurrent jaundice	5
Vitiligo	2
Pigmentation of the skin (chloasma?)	3
Sallow and pallid color, especially in younger individuals	17
Dermatitis	5
Rheumatoid arthritis	3
Pathological nails	3
Cardiorenal disease	2

None of the above-listed symptoms, seen in 76 percent of the entire group, can be regarded as specific of selenium poisoning, and it is not certain that any one is the direct result of continual ingestion of selenium. In the light of the experimental data recently published on the chronic toxicity and pathology of selenium in lower animals (*2*), we believe that the high incidence of gastrointestinal disturbances is significant. The incidence of jaundice and frank symptoms of hepatitis is probably too low for selenium to be definitely implicated, though in chronic poisoning in experimental animals with doses of inorganic selenium probably not far removed from those absorbed in the present group microscopic lesions of the liver are frequent (*2*). The high incidence of icteroid discoloration of the skin, we believe, is in some way related to the ingestion of selenium, though the precise relationship is not clear. In experimental animals with mild or moderate chronic selenium poisoning (both inorganic as well as organic selenium), marked bilirubinemia has not been observed so far.[1] Whether or not other pigments are involved is not yet clear. The high incidence of bad teeth seems equally uncertain, for no gross changes in tooth structure of experimental animals in chronic selenium poisoning have as yet been found. Whether or not any of the cases have blood changes of a nature often seen in experimental animals in chronic selenium poisoning will remain a matter of conjecture until the subject is studied. The other conditions enumerated seem scarcely frequent enough to be associated with selenium.

A critical study of the data would seem to indicate, on the whole, that the continuous exposure to small doses of organic selenium is not as harmful as might be expected from the toxic nature of the element in the form of selenite or selenate. The evidence as to the relative toxicity in rats of inorganic selenium and the organic variety as it occurs naturally in foodstuffs is conflicting (*3, 4, 5*). It is possible that the relative lethal concentrations of the two types of

[1] Unpublished data.

selenium in rats may be quite different from the relative concentrations required to produce organic or functional damage in tissues and organs of higher animals. The former has little bearing on the human problem, the latter an important one. Experimental data which we have recently presented indicate that in chronic poisoning with inorganic selenium in cats the excretion level of selenium in the urine bears a rather definite relationship to the daily dose ingested, so that for doses ranging between 0.02 and 0.25 mg of selenium per kilo per day the concentration percent of selenium in the urine under normal conditions of diuresis is from 150 to a little over 200 percent of the daily per kilogram dose (*6*). Further observations with naturally occurring organic selenium now in progress seem to indicate a somewhat lower excretion level and a correspondingly greater storage of selenium in the tissues.[1] We may reasonably assume, therefore, that our subjects detailed in tables 1–A, 1–B, and 1–C have been absorbing probably continually in the neighborhood of from 0.01 to 0.1, and possibly as much as 0.2 mg per kilo per day. None of the subjects of our study has lived on seleniferous farms less than 3 years, and the great majority have lived on such farms from 10 to 40 years. Since the experimental evidence is against acquired tolerance for selenium and rather for its cumulative effects (*2*), the only plausible explanation left is the probable lower toxicity of organic selenium compared with inorganic.

THE SOURCES OF SELENIUM

The analytical data on the most probable sources of selenium to which man may be exposed in the seleniferous region studied are outlined in tables 2, 3, and 4. In table 2 the incidence of selenium in drinking water, milk, eggs, and meat is shown. It will be seen that out of 44 samples of drinking water from wells varying in depth from 20 to several hundred feet only about 23 percent showed the presence of selenium in the relatively small amounts of from 5 to 33 micrograms per 100 cc. No definite relationship between the depth of the well and the selenium content of the water could be discovered. Milk, of which 50 samples were obtained, showed some selenium in every instance, the amounts varying usually from 16 to 127 micrograms per 100 g. In a few instances milk was obtained from so-called "alkalied" cows and its selenium content compared with the milk pooled from the entire herd of the farm, but no constant marked differences were noted. Eggs and meats have invariably shown the highest concentration and the highest incidence of contamination with selenium. Unfortunately but few specimens of meat were obtained, for at the time when the field survey was conducted it did not appear probable that meats would constitute an important source

[1] Unpublished data.

of selenium. We had had at that time some information on the distribution and storage of selenium in the tissues of animals in chronic poisoning with inorganic selenium and our results had indicated that only small amounts of selenium could be found in muscle (*6*). Since then we have been accumulating data on the storage of selenium in the tissues of animals in chronic poisoning with selenium-bearing cereal grains and the experimental evidence [1] fully confirms the field findings concerning the relatively high selenium content of meats. Of the six samples of meat secured, four samples of canned or salted pork contained 117, 160, 330, and 800 micrograms per 100 g, respectively, one sample of raw chicken muscle contained 219, and one sample of cooked lean beef contained 222 micrograms per 100 g. All the meat samples were, of course, from local stock slaughtered for the exclusive use of the family group.

TABLE 2.—*The selenium content of water, milk, eggs, and meat*

Material	Total number of samples	Number of samples showing—			Micrograms of selenium per 100 cc or g	
		No selenium	Traces	Positive	Minimum	Maximum
Water	44	20	14	10	5	33
Milk	50	0	6	44	16	127
Eggs	32	0	0	32	25	914
Meats	6	0	0	6	117	800

Of the 32 samples of eggs, 22 percent contained less than 100 micrograms of selenium per 100 g, and 78 percent contained it in excess of 100 micrograms per 100 g. It seemed of interest to ascertain the distribution of selenium in the different parts of the egg. Accordingly, separate analyses were made in several instances of the white, yolk, and shell, with the following rather inconstant results.

Concentration of selenium in parts of egg expressed in micrograms per 100 grams

Sample	White	Yolk	Shell
1	110	119	
2	390	226	
3	500	695	402
4	178	91	307
5	128	86	Trace
6	120	103	

Table 3 summarizes the selenium content of bread and cereal grains. Of the 11 samples of bread it will be noted that only 6 contained estimable amounts of selenium, and it is not certain whether the small amounts of selenium found had been present in the flour or were added to the flour with the milk, eggs, etc., often used in baking. In

[1] Unpublished data.

every instance the flour had been purchased from local mills.[2] The other cereals enumerated in this table are of no direct importance, for only in exceptional instances were they used for human consumption. Even wheat is not as a rule used directly, but is usually exchanged for flour at some conveniently located mill where the selenium content of the grain may be reduced by dilution to a small or even negligible amount. Since all the cereal grains are, however, used for animal feed, the figures in the table illustrate the manner in which selenium finds its way into the human body.

TABLE 3.—*The selenium content of bread and cereal grains*

Material	Total number of samples	Number of samples showing—			Micrograms of selenium per 100 cc or g	
		No selenium	Traces	Positive	Minimum	Maximum
Bread	11	0	5	6	25	100
Wheat	8	0	1	7	115	1,880
Corn	21	1	0	20	100	1,490
Barley	7	0	0	7	165	575
Oats	3	0	0	3	200	1,000
Rye	3	0	0	3	87	380

Table 4 shows the incidence and occurrence of selenium in vegetables obtained from a few gardens of the 50 farms comprising this study. Some of the samples were canned from the 1935 season and some were fresh from the garden. In a number of instances several different varieties were obtained from the same garden patch to ascertain whether or not the selenium content of closely growing vegetables on a common soil is the same. The results seem to indicate that not all plants have the same capacity for absorbing selenium from a given soil. Thus it would seem that such vegetables as potatoes, cucumbers, beets, tomatoes, and carrots are generally low in selenium, while cabbage, rutabaga, and especially onions can concentrate selenium to a very high degree. The number of samples we were able to obtain from any one place was limited, and we cannot make a very positive general assertion on this point, but our observations do seem to confirm Beath's findings to the effect that certain native range plants such as astragalus, oonopsis, woody aster, and others can concentrate selenium to a far greater extent than certain other range plants growing alongside of them (7).

[2] 5 had been purchased from Gregory Mills and 6 from Trisco Mills.

TABLE 4.—*The selenium content of vegetables*

Material	Total number of samples	Number of samples showing—			Micrograms of selenium per 100 cc or g	
		No selenium	Traces	Positive	Minimum	Maximum
Cucumber	12	2	3	7	12	56
Potato	12	0	2	10	24	94
Beets	13	1	4	8	32	118
Tomato	17	1	3	13	18	122
Carrots	10	0	4	6	43	130
Peas and beans	9	0	3	6	38	204
Cabbage	5	0	0	5	23	452
Rutabaga	2	0	0	2	172	600
Onion	19	0	1	18	36	1,780

In table 5 we have attempted to correlate the urinary concentration of selenium found in human subjects on a given farm with the selenium concentration of such samples of foodstuffs as we have been able to secure. The results show very clearly that the selenium content of the foodstuffs entering directly or indirectly into the human dietary determines the extent of selenium absorption in man, and that the chief sources of selenium in man are the animal foods, such as meats, eggs, and milk, vegetables playing only a secondary and variable role. Indeed it would seem that the selenium content of the urine of man is a very good criterion of the occurrence and extent of selenium on a given farm.

TABLE 5.—*Relation of urinary selenium to food selenium, micrograms per 100 cc or g*

Family no.	Urinary selenium, micrograms per 100 cc	Food selenium, micrograms percent (figures in parentheses show number of samples analyzed)				
		Milk	Eggs	Meat	Vegetables	Cereal grain
97	25, 27, 32	Trace	57		Trace (7)	Trace (1).
51	20, 27		135	160	36 (1)	190 (1).
22	20, 21	36	140		41–74 (2)	Trace (1).
113	20, 20, 24	25	145		30–82 (2)	0 (1).
52	26	25	82		Trace–58 (4)	
83	13, 38, 40	34		219		
27	29, 56	22		222		
76	43, 73	35	408	330	27–105 (5)	
107	94	39	365		Trace–16 (2)	
47	70, 80, 98	57	308		23–204 (5)	330 (1).
74	108, 110	Trace	412			45–100 (2).
78	109, 114	36	504		103–1,780 (2)	860 (1).
16	105, 36, 133	114			242 (1)	250–1,880 (5).
19	124, 198	127		800	126 (1)	420–1,000 (3).

SUMMARY AND CONCLUSIONS

A field study was made during September 1936 of a selected group comprising 50 rural families in a highly seleniferous area in 4 counties of South Dakota and Nebraska.

One hundred urine specimens from as many subjects were analyzed for selenium. The selenium concentration for the whole group varied from 20 to 198 micrograms per 100 cc. There was, as a rule, little variation in the urinary concentration of selenium for the several members of the same family or for the same individual at different times, thus indicating that the excretion level of selenium in man is a fairly reliable index of the availability of selenium and of the hazard to which he is exposed.

Outside of a high incidence of symptoms pointing to gastric or intestinal dysfunction, and a few instances of apparent hepatic dysfunction, both probably the result of continual selenium ingestion, no other evidence of ill health was seen that could be ascribed to selenium with any degree of certainty.

Analysis of many samples of locally produced foodstuffs which enter directly or indirectly into the human dietary indicates that meat, eggs, and milk, and vegetables when available, constitute the most important and most constant sources of selenium to which man is exposed in the selenium endemic region studied.

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HOW EXPENDITURES FOR SELECTED PUBLIC HEALTH SERVICES ARE APPORTIONED[1]

By Joseph W. Mountin, *Surgeon, United States Public Health Service*

When assembling and analyzing data designed to show how expenditures for selected public health services are apportioned, it is necessary to operate within limits that are clearly set forth, since programs of public health may differ among communities as to content and to method of administration. The variations in actual patterns of organizations arise from an interplay of two main factors: difference in the assignment of responsibilities to particular agencies and difference in the emphasis that is placed on specific services. Another factor which complicates the analysis is the difficulty of determining the population over which costs and services are actually distributed.

Composites of personnel and of expenditures for all agencies in counties have been chosen in preference to corresponding indexes for the minor civil divisions, because agencies tend to have overlapping

[1] From the Division of Public Health Methods, National Institute of Health.

jurisdictions. The services under consideration are those health-promotion activities that commonly constitute the program of health departments and voluntary health agencies. In order that there may be a basis for comparison, unusual items that entail disproportionately high expenditures are omitted. In the excluded category are collection of refuse, building inspection, medical relief, and the operation of hospitals and allied institutions. Obviously no account can be taken of social action in fields of general welfare that may contribute only indirectly to personal or community health.

The 94 [2] counties comprising the group appearing in this analysis were limited to those which included areas chosen to satisfy the requirements of the National Health Inventory in its survey of chronic diseases rather than to present schemes of health administration commonly found in this country. The counties were selected so as to give representation to different social, economic, and industrial conditions and to encompass whatever variation in illness incidence that may be experienced throughout the United States. The sample must be accepted as being weighted with populous counties and those having a high percentage of urban inhabitants. In these counties, however, the lesser political units such as villages, boroughs, and townships are well represented.

TABLE 1.—*Distribution of expenditures for selected public health services in 94 counties according to population of county and type of agency with administrative responsibility*

Population group	Number of counties	Population	Total expenditures	Per capita expenditures			
				Total	Health departments	Other official agencies	Non-official agencies
All groups	94	33, 978, 479	$29, 310, 895	$0. 86	$0. 52	$0 11	$0 23
Under 20,000	15	191, 274	103, 355	. 54	. 32	. 14	. 08
20,000-59,999	25	856, 580	340, 573	. 40	. 23	. 13	. 04
60,000-99,999	14	1, 020, 428	503, 476	. 48	. 31	. 11	. 07
100,000-249,999	13	2, 244, 347	1, 781, 276	. 79	. 41	. 17	. 21
250,000-499,999	13	4, 919, 583	3, 575, 381	. 73	. 43	. 12	. 18
500,000 and over	14	24, 746, 267	23, 006, 834	. 93	. 57	. 10	. 26

During the fiscal year ended in 1936, a total of approximately $29,500,000 was expended by all agencies of the 94 counties. This amount distributed over the 34 million inhabitants is equivalent to about 86 cents per capita. From table 1 the reader will observe that, with one apparent exception, the more populous groups of counties lead in per capita expenditures. The apparent exception, which occurs in the group lowest in population, can be attributed to unusual expenditures by a few contained counties that receive large grants-in-aid from an endowment. Generally speaking, public health or-

[2] Five counties included in New York City have been classified as a single county area.

ganization reaches its highest development in cities of large size. The health program of a large city tends to have a leavening influence on health for the whole county of which the city is a part, since many urban services extend beyond the limits of the large city.

In comparing the combined expenditures of this group of counties with the outlays for similar public health services by counties entered in the Inter-Chamber of Commerce Health Conservation Contest [3] one finds that the Health Inventory counties exceed by about 16 cents per capita. The Contest counties as a whole are less urban in character than the Health Inventory group. Another part of the difference may be attributed to the practice of excluding from the Contest counties portions not under the jurisdiction of the county health department. Counties containing large cities are affected in particular by this procedure. While the Health Inventory counties devote larger sums to public health than do those reported by the Contest, still it is well to point out that the Health Inventory counties expend only about half the amount of money per capita commonly regarded [4] as necessary for the support of those elementary public health services which form the basis of this comparison.

Notwithstanding the fact that the services under consideration are well defined in character and generally accepted as being of primary interest to health departments, there appears to be a wide dispersion of responsibility for their administration. The extent of this dispersion is suggested by data in table 1. Towards defraying a gross per capita expenditure of 86 cents, governments contribute 52 cents through their health departments and 11 cents through other official agencies, while nonofficial agencies supply the remaining 23 cents. Among those classed as "Other official agencies," boards of education lead in sums devoted to health work. Public welfare departments rank second in order, yet the amount of funds at their disposal for health work is considerably below that of educational authorities. Voluntary agencies submitted information which portrays a wide range of programs covering services that exist in varying combinations. When these agencies are classified as to groups and interests, nursing organizations are found to report the largest expenditures. Second place in some counties is occupied by agencies expressing major interest in tuberculosis, while in others child health occupies this position. Maternity hygiene, mental hygiene, and social hygiene each have a large number of sponsors, but the sums at their disposal are not large.

Earlier in the paper it was pointed out that per capita expenditures tend to increase as counties are found in the higher population brackets.

[3] Walker, W. F., and Feldman, L.: Consolidated county expenditures for selected public health service. Am. J. Pub. Health, vol. 27, no. 2, February 1937.

[4] Hiscock, Ira V.: Community health organization. The Commonwealth Fund, New York, N. Y. 1932.

Agencies of the three classes, health departments, other official, and nonofficial, share somewhat disproportionately in these increases. The unusually high per capita figures reported by the group of counties below 20,000 population have already been explained. After excluding this group of counties, which may be regarded as atypical, there is found a general upward trend in expenditures by both the health departments and nonofficial agencies. This trend is very definitely exaggerated in the group containing 500,000 or more inhabitants. The practice with regard to proportionate assignment of responsibility among agencies of different classes would appear to be fairly uniform among the counties in various population groups. In a few instances, however, smaller counties discharge more services through official agencies other than health departments, but this practice is not so apparent when all small counties are considered as a group. The parallelism in rates of expenditures by health departments and by nonofficial agencies for the counties of different sizes is not in keeping with the common impression that activities of voluntary agencies tend to compensate for deficiencies in the programs supported by taxation.

Another item of particular interest to health administrators is the practice pursued under varying circumstances with regard to proportionate allotments for operating expenses and for salaries of employees presenting qualifications of different types. Data bearing on these points may be found in tables 2 and 3. One shows the variation in distribution of expenditures as it may be affected by population of the county, and the other describes the practice followed by agencies operating under different auspices.

TABLE 2.—*Distribution of expenditures for selected health services in 94 counties according to population group of counties and purpose of expenditures*

Population group	Number of counties	Total expenditures	Percentage distribution of expenditures					
			Salary					Operating costs
			Physicians	Dentists	Nurses	Inspectors	Others	
All counties	94	$29,310,895	0.14	0.02	0.30	0.08	0.25	0.21
Under 20,000	15	103,355	.24	.03	.30	.06	.10	.27
20,000-59,999	25	340,573	.23	.01	.32	.06	.15	.23
60,000-99,999	14	503,476	.17	.02	.24	.08	.16	.33
100,000-249,999	13	1,781,276	.15	.04	.35	.08	.19	.19
250,000-499,999	13	3,575,381	.13	.01	.27	.07	.25	.27
500,000 and over	14	23,006,834	.14	.02	.30	.09	.25	.20

In this group of 94 counties approximately 80 percent of the expenditures is allotted to salaries and the remainder to operation. Operating expenses include, as a rule, such items as transportation, communication, office supplies, and materials used in the conduct of a laboratory. Rent may be a sum of considerable importance in the

budget of voluntary agencies; however, this is seldom true of official agencies since they usually are housed in public buildings. In the smaller counties, agencies allot proportionately more of their funds for operating expenses than do those in more populous classes. This is to be expected, since many administrative costs are somewhat fixed, hence they tend to be relatively high in small budgets. About 30 percent of salary funds is set apart for nurses; this is by far the largest group item in the salary budget. The percentage is fairly consistent among counties of different classes. The salary item for employees designated "Others" follows in the order of magnitude. This is a large but varied group ranging in skill from janitors to administrators and laboratory workers. The higher development of laboratory, clerical, and statistical services in the populous counties accounts in a large measure for the greater proportion of expenditures devoted to salaries of groups designated as "Others."

TABLE 3.—*Distribution of expenditures for selected health services in 94 counties according to type of agency in control and purpose of expenditures*

Type of agency	Total budget	Percentage distribution of expenditures					
		Salary					Operating costs
		Physicians	Dentists	Nurses	Inspectors	Others	
All agencies	$29,310,895	0.14	0.02	0.30	0.08	0.25	0.21
Health departments	17,631,904	.15	.01	.23	.14	.28	.19
Other governmental	3,845,204	.27	.04	.42	.01	.15	.11
Nongovernmental	7,833,787	.05	.02	.40	.01	.21	.32

When the proportionate distribution of health budgets is studied in relation to the policy of various agencies, distinct differences are to be noted. (See table 3.) As compared with agencies of other types, health departments favor inspectors and employees designated as "Others." This merely expresses greater responsibilities for sanitation programs and the operation of laboratories. It must be understood that health departments are the largest employers of physicians and nurses, even though the percentage of their budgets assigned for these salaries may not be as great as that reported by other agencies. Such proportionately low operating costs as are reported from health departments may be explained in part by the large size of those departments when compared with agencies in other categories. Those agencies designated as "Other governmental" rank first in the proportion of funds devoted to salaries of physicians and nurses. School boards dominate the picture in this agency group, and they are known to employ nurses and physicians almost exclusively. The high percentage of funds that nongovernmental agencies also devote to nurses

is to be expected since this group is made up largely by visiting nurse associations, and agencies especially interested in child care. Such agencies would be expected to have high operating costs since they must transport their field nurses, pay rent, and furnish large quantities of materials used in caring for patients both in clinics and in homes.

Especially the person concerned with health administration will be interested in the following points that are brought out by the foregoing analysis: Responsibility for public health service rests with so many agencies that there must be considerable loss in effectiveness of program and in economy of administration. In a group of 94 counties, distinctly above the average in resources, expenditures for selected public services fell below amounts regarded as necessary to support adequate organizations. Salaries of public health nurses account for nearly one-third of all funds expended. Both governmental agencies other than health departments and those which are nonofficial devote a particularly high percentage of their funds to nursing. Practically all sanitary inspectors are employed by health departments. Health departments, too, support most of the laboratory service and employ more persons for clerical positions in proportion to total employees than is true of other agencies. Nonofficial agencies, however, report the highest operating costs. Other data not presented in this paper show that the distribution of expenditures is determined very largely by the various combinations of items that comprise the programs of agencies having different sets of responsibilities.

DEATHS DURING WEEK ENDED SEPT. 11, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 11, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	6,883	6,976
Average for 3 prior years	6,950	
Total deaths, first 36 weeks of year	316,367	316,804
Deaths under 1 year of age	483	501
Average for 3 prior years	515	
Deaths under 1 year of age, first 36 weeks of year	20,351	20,068
Data from industrial insurance companies:		
Policies in force	69,801,191	68,415,419
Number of death claims	8,943	8,880
Death claims per 1,000 policies in force, annual rate	6.7	6.8
Death claims per 1,000 policies, first 36 weeks of year, annual rate	10.0	10.1

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 18, 1937, and Sept. 19, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936
New England States:								
Maine	3	1	1			8	0	3
New Hampshire		1				1	0	0
Vermont	2				1	3	0	0
Massachusetts		7			10	17	1	1
Rhode Island					2		0	0
Connecticut	4		1	2	2	3	0	0
Middle Atlantic States:								
New York	10	18	[1] 6	[1] 2	74	36	5	4
New Jersey	12	10	4	8	20	14	2	1
Pennsylvania	22	14			84	16	7	2
East North Central States:								
Ohio	12	14	15	8	55	12	7	1
Indiana	13	15	8	7	3	2	0	1
Illinois	23	28	8	4	44	10	1	3
Michigan	12	13			14	14	3	1
Wisconsin	5	4	20	6	40	17	1	0
West North Central States:								
Minnesota	2	5			5	6	0	0
Iowa	2	2			3	3	0	0
Missouri	21	6	11	18	43		2	0
North Dakota	1		2	4	2		1	0
South Dakota	1					2	1	0
Nebraska		3				1	0	0
Kansas	4	9	3		5	1	0	0
South Atlantic States:								
Delaware						2	1	0
Maryland [2]	6	3	4	2	5	7	2	3
District of Columbia	2	5					0	0
Virginia [2]	32	23			6	4	1	2
West Virginia	16	5	18	2	9	2	3	4
North Carolina [3]	72	53			18	6	0	2
South Carolina [3]	18	27	104	94	7		1	0
Georgia [3]	30	27					0	1
Florida [3]	17	5		3	6		1	0
East South Central States:								
Kentucky	33	11	7		8	13	2	3
Tennessee	45	48	22	7	18	1	3	6
Alabama [3]	30	29	10	11	2		2	2
Mississippi [3] [4]	9	19					0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 18, 1937, and Sept. 19, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936
West South Central States:								
Arkansas	16	7	1		1		0	0
Louisiana [3]	10	11	2	7			2	1
Oklahoma [5]	3	10	10	16	1	1	2	1
Texas [3]	26	33	79	20	20	10	0	3
Mountain States:								
Montana	1			5	8	1	0	0
Idaho				1	3		0	0
Wyoming	1				1	4	0	0
Colorado	11	3			7	3	1	0
New Mexico	2	1			2	10	0	0
Arizona	9	2	15	9		4	0	0
Utah [4]	7	1			10	1	0	0
Pacific States:								
Washington				1	10	11	0	0
Oregon	3	1	10	4	7	2	0	0
California	17	30	10	15	21	40	1	4
Total	565	499	371	256	577	288	53	49
First 37 weeks of year	15,435	16,474	275,825	141,043	243,814	268,660	4,389	6,110

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936
New England States:								
Maine	16	1	3	6	0	0	1	1
New Hampshire	1	0	1	3	0	0	1	0
Vermont	6	0	3	2	0	0	3	0
Massachusetts	41	1	45	43	0	0	5	4
Rhode Island	4	0	4	12	0	0	0	1
Connecticut	16	0	12	9	0	0	4	4
Middle Atlantic States:								
New York	91	12	88	86	0	0	36	20
New Jersey	21	1	16	13	0	0	12	19
Pennsylvania	40	8	73	105	0	0	50	22
East North Central States:								
Ohio	59	17	133	111	0	0	83	39
Indiana	10	3	44	36	5	0	3	17
Illinois	81	48	101	96	0	4	28	26
Michigan	57	11	81	76	2	4	10	7
Wisconsin	45	4	27	68	0	1	6	4
West North Central States:								
Minnesota	52	8	23	27	2	4	5	2
Iowa	35	4	24	18	2	2	1	4
Missouri	47	4	74	25	3	0	33	23
North Dakota	0	2	4	3	0	14	0	1
South Dakota	3	0	14	9	0	0	1	0
Nebraska	18	0	10	5	1	0	0	1
Kansas	30	3	31	18	0	0	14	7
South Atlantic States:								
Delaware	0	0	3	1	0	0	1	1
Maryland [3]	7	7	30	17	0	0	17	5
District of Columbia	2	0	5	8	0	0	1	0
Virginia [3]	5	5	7	12	0	0	18	24
West Virginia	2	7	26	29	0	0	15	28
North Carolina [3]	4	1	31	48	1	0	9	28
South Carolina [3]	1	0	8	6	0	0	14	13
Georgia [3]	5	9	20	22	0	0	13	32
Florida [3]	1	1	1	4	0	0	6	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 18, 1937, and Sept. 19, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever	
	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936	Week ended Sept. 18, 1937	Week ended Sept. 19, 1936
East South Central States:								
Kentucky	4	1	31	31	0	5	25	56
Tennessee	1	17	21	36	0	0	12	31
Alabama [3]	3	13	20	14	0	0	6	13
Mississippi [3] [4]	4	6	8	58	0	0	7	19
West South Central States:								
Arkansas	9	1	6	5	0	0	13	7
Louisiana [3]	8	2	7	7	0	0	18	14
Oklahoma [5]	19	1	12	2	0	0	11	24
Texas [3]	33	5	24	27	1	0	56	28
Mountain States:								
Montana	4	0	37	11	3	5	3	16
Idaho	0	1	9	4	4	0	8	1
Wyoming	5	2	6	-------	0	0	0	1
Colorado	21	8	9	12	1	3	6	2
New Mexico	3	4	6	2	0	0	16	20
Arizona	3	2	7	-------	0	0	6	3
Utah [4]	4	0	36	3	0	0	0	0
Pacific States:								
Washington	10	10	12	13	14	2	6	5
Oregon	2	2	16	10	5	0	5	7
California	46	15	89	88	4	0	16	20
Total	879	242	1,298	1,241	48	44	604	600
First 37 weeks of year	6,391	2,201	168,788	182,651	8,184	6,070	10,614	9,769

[1] New York City only.
[2] Rocky Mountain spotted fever, week ended Sept. 18, 1937, 4 cases, as follows: Maryland, 1; Virginia, 3.
[3] Typhus fever, week ended Sept. 18, 1937, 68 cases, as follows: North Carolina, 1; South Carolina, 1; Georgia, 28; Florida, 7; Alabama, 14; Mississippi, 2; Louisiana, 1; Texas, 14.
[4] Week ended earlier than Saturday.
[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
August 1937										
Alabama	18	48	14	765	15	18	13	25	18	67
Georgia	3	79	24	823	12	29	17	32	0	103
Illinois	16	63	21	48	286	3	195	311	16	106
Indiana	5	24	13	4	72	-------	34	82	15	26
Michigan	2	41	5	10	209	-------	102	412	2	65
Minnesota	6	8	4	-------	15	-------	43	92	18	9
Nevada	-------	-------	-------	-------	-------	-------	[1] 1	4	0	2
New Jersey	6	19	9	6	189	-------	36	52	0	31
Ohio	10	39	19	6	372	-------	184	302	-------	237
Tennessee	4	41	87	229	70	30	10	44	1	167
Virginia	11	67	51	22	61	7	11	30	0	97

[1] Delayed report of case occurring in July.

Summary of monthly reports from States—Continued

August 1937

	Cases
Actinomycosis:	
Illinois	2
Anthrax:	
New Jersey	1
Chicken pox:	
Alabama	37
Georgia	8
Illinois	136
Indiana	16
Michigan	91
Minnesota	81
New Jersey	67
Ohio	79
Tennessee	11
Virginia	3
Conjunctivitis, infectious:	
Georgia	12
Dengue:	
Alabama	1
Georgia	1
Diarrhea and enteritis:	
Ohio (under 2 years)	75
Dysentery:	
Georgia (amoebic)	13
Georgia (bacillary)	26
Illinois (amoebic)	14
Illinois (amoebic carriers)	40
Illinois (bacillary)	104
Michigan (amoebic)	5
Michigan (bacillary)	10
Minnesota (amoebic)	1
Minnesota (bacillary)	3
New Jersey (amoebic)	2
New Jersey (bacillary)	3
Ohio (amoebic)	1
Ohio (bacillary)	7
Tennessee (amoebic)	3
Tennessee (bacillary)	56
Virginia (diarrhea included)	521
Encephalitis, epidemic or lethargic:	
Alabama	1
Georgia	1
Illinois	7
Indiana	1
Minnesota	8
New Jersey	1
Ohio	6
German measles:	
Alabama	3
Illinois	36
Michigan	40
New Jersey	30
Ohio	15
Tennessee	3
Hookworm disease:	
Georgia	421
Michigan	1
Tennessee	2
Impetigo contagiosa:	
Tennessee	7
Lead poisoning:	
Illinois	2
Ohio	16
Mumps:	
Alabama	51
Georgia	13
Illinois	198
Indiana	9
Michigan	220
New Jersey	123
Ohio	48
Tennessee	46
Virginia	40
Ophthalmia neonatorum:	
Alabama	1
Illinois	7
Minnesota	3
New Jersey	7
Ohio	71
Tennessee	4
Virginia	3
Paratyphoid fever:	
Georgia	5
Illinois	5
Michigan	6
Minnesota	1
New Jersey	5
Ohio	1
Tennessee	12
Virginia	1
Puerperal septicemia:	
Georgia	1
Ohio	5
Tennessee	2
Rabies in animals:	
Alabama	58
Illinois	34
Indiana	58
Michigan	1
New Jersey	4
Rabies in man:	
Alabama	1
Illinois	1
Michigan	1
Tennessee	1
Rocky Mountain spotted fever:	
Illinois	2
Indiana	1
New Jersey	1
Tennessee	5
Virginia	11
Septic sore throat:	
Georgia	30
Illinois	10
Michigan	9
Minnesota	8
Septic sore throat—Con.	
Ohio	57
Tennessee	8
Virginia	6
Tetanus:	
Alabama	4
Illinois	4
Michigan	3
Minnesota	1
New Jersey	2
Ohio	3
Tennessee	3
Virginia	5
Trachoma:	
Illinois	92
Michigan	1
Tennessee	3
Trichinosis:	
Illinois	2
Michigan	2
New Jersey	1
Tularaemia:	
Georgia	2
Illinois	2
Michigan	1
Minnesota	6
Tennessee	2
Virginia	1
Typhus fever:	
Alabama	73
Georgia	146
Tennessee	4
Undulant fever:	
Alabama	8
Georgia	4
Illinois	8
Indiana	1
Michigan	8
Minnesota	10
New Jersey	5
Ohio	4
Virginia	2
Vincent's infection:	
Illinois	14
Michigan	21
Tennessee	4
Whooping cough:	
Alabama	99
Georgia	297
Illinois	751
Indiana	131
Michigan	955
Minnesota	282
Nevada	9
New Jersey	310
Ohio	1,005
Tennessee	211
Virginia	242

CASES OF VENEREAL DISEASES REPORTED FOR JULY 1937

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

State	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama	1,506	5.26	423	1.48
Arizona	48	1.18	99	2.44
Arkansas [1]	615	3.04	338	1.67
California	2,148	3.55	2,286	3.77
Colorado	141	1.32	59	.55
Connecticut	200	1.15	117	.67
Delaware	197	7.61	66	2.55
District of Columbia	186	3.00	178	2.88
Florida	1,834	11.17	345	2.10
Georgia	1,780	5.82	477	1.53
Idaho	38	.78	52	1.07
Illinois	2,424	3.09	1,506	1.93
Indiana	214	.62	122	.35
Iowa [1]	299	1.18	216	.85
Kansas	177	.94	61	.32
Kentucky [2]				
Louisiana	194	.91	120	.57
Maine [1]	37	.43	77	.90
Maryland [3]	325	1.94	227	1.36
Massachusetts	514	1.16	506	1.14
Michigan	735	1.54	694	1.45
Minnesota	255	.97	266	1.01
Mississippi	2,156	10.74	2,637	13.13
Missouri	660	1.67	4[illegible]0	1.16
Montana [1]	54	1.02	40	.75
Nebraska	78	.57	118	.87
Nevada [4]				
New Hampshire	15	.30	4	.08
New Jersey	648	1.50	224	.52
New Mexico [1]	121	2.87	37	.88
New York [2]				
North Carolina	2,240	6.48	361	1.04
North Dakota [2]				
Ohio [1]	1,144	1.70	463	.69
Oklahoma [1]	642	2.54	343	1.36
Oregon	125	1.23	249	2.45
Pennsylvania [5]	1,641	1.62	200	.20
Rhode Island	77	1.13	92	1.35
South Carolina [2]				
South Dakota [2]				
Tennessee	1,035	3.61	607	2.12
Texas	586	.96	205	.34
Utah	2	.04	7	.14
Vermont [2]				
Virginia	1,557	5.83	439	1.64
Washington	189	1.15	260	1.58
West Virginia	347	1.90	162	.89
Wisconsin [5]	223	.77	56	.19
Wyoming [4]				
Total	27,407	2.52	15,199	1.40

See footnotes at end of table.

Reports from cities of 200,000 population or over

State	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Akron, Ohio	58	1.95	46	1.69
Atlanta, Ga	118	4.11	111	3.87
Baltimore, Md	409	4.96	169	2.05
Birmingham, Ala	151	5.35	68	2.41
Boston, Mass	211	2.67	199	2.52
Buffalo, N. Y	128	2.16	83	1.40
Chicago, Ill	1,107	3.10	867	2.43
Cincinnati, Ohio [2]				
Cleveland, Ohio	233	2.50	133	1.43
Columbus, Ohio	84	2.75	13	.43
Dallas, Tex	210	7.25	86	2.97
Dayton, Ohio	35	1.66		
Denver, Colo	74	2.49	55	1.85
Detroit, Mich.[2]				
Houston, Tex.[2]				
Indianapolis, Ind	21	.56	35	.93
Jersey City, N. J.[2]				
Kansas City, Mo	38	.90	5	.12
Los Angeles, Calif	606	4.23	652	4.55
Louisville, Ky	169	5.22	84	2.59
Memphis, Tenn	268	10.04	159	5.96
Milwaukee, Wis.[2]				
Minneapolis, Minn	61	1.25	86	1.77
Newark, N. J	229	4.94	110	2.37
New Orleans, La.[2]				
New York, N. Y	8,669	11.87	1,992	2.73
Oakland, Calif	61	2.01	81	2.67
Omaha, Nebr	50	2.27	44	2.00
Philadelphia, Pa.[2]				
Pittsburgh, Pa	98	1.43	25	.37
Portland, Oreg.[4]				
Providence, R. I	48	1.85	34	1.31
Rochester, N. Y	52	1.54	57	1.69
St. Louis, Mo	239	2.86	233	2.78
St. Paul, Minn	33	1.17	32	1.13
San Antonio, Tex.[2]				
San Francisco, Calif	233	3.47	283	4.22
Seattle, Wash	47	1.24	56	1.47
Syracuse, N. Y	125	5.74	77	3.53
Toledo, Ohio				
Washington, D. C.[6]	186	3.00	178	2.88

[1] Incomplete.
[2] No report for current month.
[3] Reported by clinics.
[4] Not reporting.
[5] Only cases of syphilis in the infectious stage are reported.
[6] Reported by social-hygiene clinic.

WEEKLY REPORTS FROM CITIES

City reports for week ended Sept. 11, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	143	68	15	118	288	325	3	348	102	940	--------
Current week [1]	81	30	14	198	270	273	3	304	68	925	--------
Maine:											
Portland	0	------	0	0	1	0	0	0	0	1	21
New Hampshire:											
Concord	0	------	0	0	0	0	0	1	0	0	5
Manchester	0	------	0	0	0	0	0	1	0	0	7
Nashua	0	------	0	0	1	0	0	0	0	13	3
Vermont:											
Barre	------	------	------	------	------	------	------	------	------	------	------
Burlington	0	------	0	0	0	0	0	0	0	0	7
Rutland	0	------	0	0	0	0	0	0	0	0	6
Massachusetts:											
Boston	1	------	0	3	16	3	0	6	0	13	166
Fall River	0	------	0	1	1	0	0	0	0	14	15
Springfield	0	------	0	1	0	3	0	2	0	14	31
Worcester	0	------	0	1	3	0	0	1	0	4	43
Rhode Island:											
Pawtucket	0	------	0	0	0	1	0	0	0	0	8
Providence	0	------	0	0	0	5	0	0	1	18	41
Connecticut:											
Bridgeport	0	1	0	0	4	2	0	1	0	1	25
Hartford	0	------	0	0	1	1	0	1	3	3	24
New Haven	0	1	0	2	0	0	0	0	1	1	23
New York:											
Buffalo	0	------	0	3	3	5	0	7	3	7	121
New York	11	2	1	34	43	24	0	70	12	112	1,152
Rochester	0	------	0	0	0	0	0	0	0	13	58
Syracuse	0	------	0	1	3	0	0	0	0	16	42
New Jersey:											
Camden	0	------	1	0	1	0	0	1	0	0	36
Newark	0	1	0	2	3	1	0	4	0	15	85
Trenton	0	------	0	1	1	2	0	3	0	0	34
Pennsylvania:											
Philadelphia	3	------	0	2	15	5	0	18	3	22	399
Pittsburgh	0	------	0	7	7	6	0	5	1	14	150
Reading	0	------	0	3	1	0	0	0	0	0	20
Scranton	0	------	0	1	------	0	0	------	0	4	------
Ohio:											
Cincinnati	------	------	------	------	------	------	------	------	------	------	------
Cleveland	0	4	0	10	5	15	0	9	4	53	154
Columbus	1	------	0	2	2	4	0	4	1	10	73
Toledo	1	------	0	5	4	3	0	2	2	19	51
Indiana:											
Anderson	0	------	0	0	1	0	0	0	0	5	6
Fort Wayne	0	------	0	0	0	0	0	0	0	0	18
Indianapolis	3	------	0	4	6	3	0	5	0	19	84
Muncie	0	------	0	0	1	0	0	0	0	0	9
South Bend	0	------	0	1	0	2	0	0	0	1	15
Terre Haute	0	------	0	0	0	1	0	0	0	0	27
Illinois:											
Alton	0	------	0	2	0	3	0	0	0	0	4
Chicago	1	7	3	21	12	42	0	34	2	68	561
Elgin	0	------	0	0	0	0	0	0	0	0	7
Moline	0	------	0	0	1	1	0	0	0	4	10
Springfield	0	------	0	1	0	2	0	0	0	3	16
Michigan:											
Detroit	7	------	2	14	9	22	0	12	3	66	207
Flint	0	------	0	1	1	9	0	0	0	8	16
Grand Rapids	0	------	0	2	1	0	0	0	0	12	32
Wisconsin:											
Kenosha	0	------	0	3	0	1	0	1	0	2	7
Madison	0	------	0	0	0	2	0	0	0	7	------
Milwaukee	0	------	0	9	2	7	0	2	0	55	63
Racine	0	------	0	3	0	1	0	0	0	0	11
Superior	0	------	0	0	0	0	0	0	0	6	8

[1] Figures for Barre, Cincinnati, and Boise estimated; reports not received.

City reports for week ended Sept. 11, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Minnesota:											
Duluth	0		0	1	1	2	0	0	0	6	13
Minneapolis	0		0	1	3	6	0	1	0	10	92
St. Paul	0		0	3	2	0	0	1	1	25	53
Iowa:											
Cedar Rapids	0			1		0	0		0	4	
Davenport	1			0		1	0		0	0	
Des Moines	0			0		8	0		0	0	28
Sioux City	1			0		0	0		0	0	
Waterloo	1			0		1	0		0	3	
Missouri:											
Kansas City	2		0	1	2	3	0	8	1	4	79
St. Joseph	1		0	0	1	0	0	2	0	0	18
St. Louis	4	1	0	23	3	14	1	3	3	8	175
North Dakota:											
Fargo	0		0	0	0	0	0	0	0	40	4
Grand Forks	0			0		0	0		0	2	
Minot	0		0	0	0	0	0	0	0	12	5
South Dakota:											
Aberdeen	0			0		0	0		0	4	
Nebraska:											
Omaha	0		0	0	7	0	0	2	0	0	52
Kansas:											
Lawrence	0		0	0	1	0	0	0	0	2	5
Topeka	0		0	0	1	2	0	0	0	11	21
Wichita	0		0	0	2	3	0	0	3	2	19
Delaware:											
Wilmington	0		0	0	1	0	0	0	0	5	23
Maryland:											
Baltimore	3	2	0	2	12	7	0	14	4	60	171
Cumberland	0		0	0	0	1	0	0	0	1	6
Frederick	0		0	0	0	0	0	0	0	0	3
District of Columbia:											
Washington	3	2	2	2	6	3	0	10	0	8	136
Virginia:											
Lynchburg	0		0	0	1	0	0	0	0	1	13
Richmond	8		0	0	1	1	0	1	2	4	51
Roanoke	0		0	0	1	1	0	0	0	1	12
West Virginia:											
Charleston	1		0	0	0	0	0	0	0	0	9
Wheeling	0		0	0	0	2	0	0	0	4	19
North Carolina:											
Gastonia	0			0		0	0		0	3	
Raleigh	0		0	0	0	1	0	0	0	3	9
Wilmington	0		0	0	0	0	0	0	0	3	11
Winston-Salem	1		0	0	0	1	0	0	0	6	7
South Carolina:											
Charleston	0		0	0	4	0	0	1	2	0	19
Columbia	0		0	0	1	0	0	3	0	0	18
Florence	0		0	1	0	0	0	0	0	0	9
Greenville	0		0	0	0	0	0	1	0	0	6
Georgia:											
Atlanta	3		0	0	9	5	0	6	1	2	87
Brunswick	1		0	0	0	0	0	0	0	0	4
Savannah	4		0	0	1	0	0	3	0	4	32
Florida:											
Miami	0		1	8	2	0	0	1	1	0	43
Tampa	0	1	1	1	1	0	0	0	0	0	26
Kentucky:											
Covington	0		0	0	0	0	0	1	0	1	12
Lexington	0		0	0	0	0	0	2	1	5	20
Louisville	1		0	1	4	10	0	2	0	17	55
Tennessee:											
Knoxville	0		1	0	1	0	0	1	2	0	20
Memphis	1		0	0	1	1	0	5	2	8	70
Nashville	0		0	0	0	1	0	1	0	2	38
Alabama:											
Birmingham	2	1	0	2	1	0	0	4	0	0	52
Mobile	0		0	0	1	0	0	3	0	0	23
Montgomery	1			0		1	0		0	2	
Arkansas:											
Fort Smith	0			0		3	0		1	0	
Little Rock	0		0	0	4	0	0	5	1	1	11

City reports for week ended Sept. 11, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Louisiana:											
New Orleans	0	1	1	0	8	2	0	6	0	5	125
Shreveport	0	------	0	0	4	0	0	2	0	0	45
Oklahoma:											
Muskogee	0	------	------	0	------	0	0	------	0	0	------
Oklahoma City	0	------	0	0	4	2	0	0	1	2	45
Texas:											
Dallas	2	------	0	0	3	2	0	0	0	0	49
Fort Worth	0	------	0	0	1	1	0	1	1	4	34
Galveston	0	------	0	0	2	1	0	0	1	0	18
Houston	10	------	0	2	6	3	0	4	8	0	81
San Antonio	0	------	0	0	1	1	0	4	2	0	54
Montana:											
Billings	0	------	0	0	0	0	0	0	0	0	7
Great Falls	0	------	0	0	0	2	0	0	0	5	5
Helena	0	------	0	0	0	0	0	0	0	1	5
Missoula	0	------	0	0	2	0	0	0	0	0	6
Idaho:											
Boise	------	------	------	------	------	------	------	------	------	------	------
Colorado:											
Colorado Springs	0	------	0	0	1	0	0	3	0	2	11
Denver	2	------	1	16	3	5	2	3	0	13	69
Pueblo	1	------	0	0	0	0	0	0	0	0	6
New Mexico:											
Albuquerque	0	------	0	0	0	1	0	2	1	4	10
Utah:											
Salt Lake City	4	------	0	1	1	6	0	0	0	11	31
Washington:											
Seattle	0	------	0	0	1	4	0	2	0	13	92
Spokane	0	------	0	0	2	1	0	1	0	2	26
Tacoma	0	------	0	0	2	3	0	0	0	2	26
Oregon:											
Portland	0	------	0	2	4	3	0	2	0	1	74
Salem	0	------	------	0	------	0	1	------	0	0	------
California:											
Los Angeles	6	4	1	7	8	15	0	16	0	34	241
Sacramento	0	------	0	1	4	0	0	3	0	8	31
San Francisco	0	2	1	0	6	4	0	4	2	18	158

City reports for week ended Sept. 11, 1937—Continued

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Maine:			
Portland	0	0	4
New Hampshire:			
Nashua	0	0	2
Massachusetts:			
Boston	0	0	7
Springfield	0	0	1
Worcester	0	0	3
Rhode Island:			
Providence	1	0	0
Connecticut:			
Bridgeport	0	0	1
New York:			
Buffalo	1	0	7
New York	1	1	51
Rochester	0	0	1
Syracuse	0	0	1
New Jersey:			
Camden	0	0	1
Newark	0	0	1
Pennsylvania:			
Philadelphia	0	0	10
Scranton	0	0	1
Ohio:			
Cleveland	0	0	12
Columbus	0	0	4
Toledo	0	0	5
Indiana:			
Indianapolis	0	0	2
Muncie	0	0	2
Terre Haute	0	0	1
Illinois:			
Chicago	1	0	62
Elgin	0	0	1
Moline	0	0	2
Springfield	0	0	1
Michigan:			
Detroit	0	0	32
Flint	0	0	1
Grand Rapids	0	0	2
Wisconsin:			
Madison	0	0	1
Milwaukee	0	0	11
Racine	0	0	1
Minnesota:			
Duluth	0	0	1
Minneapolis	0	0	8
St. Paul	0	0	10
Iowa:			
Cedar Rapids	0	0	2
Des Moines	0	0	3
Sioux City	0	0	1
Missouri:			
Kansas City	0	0	12
St. Joseph	1	0	1
St. Louis	0	0	3
North Dakota:			
Minot	0	0	1
Nebraska:			
Omaha	0	0	11
Kansas:			
Wichita	0	0	4
Delaware:			
Wilmington	3	1	0
Maryland:			
Baltimore	0	1	5
District of Columbia:			
Washington	2	0	0
West Virginia:			
Wheeling	0	0	1
Kentucky:			
Louisville	1	0	2
Tennessee:			
Memphis	0	0	1
Arkansas:			
Fort Smith	0	0	1
Little Rock	0	0	1
Louisiana:			
New Orleans	0	0	3
Shreveport	0	1	0
Oklahoma:			
Oklahoma City	0	0	1
Texas:			
Fort Worth	0	0	1
Galveston	0	0	1
Houston	0	0	8
San Antonio	0	0	1
New Mexico:			
Albuquerque	0	0	1
Colorado:			
Pueblo	0	0	5
Utah:			
Salt Lake City	0	0	5
Washington:			
Spokane	1	1	0
California:			
Los Angeles	0	0	5
Sacramento	0	0	2

Encephalitis, epidemic or lethargic.—Cases: Kansas City, 1; St. Louis, 76; Fargo, 1.
Pellagra.—Cases: Boston, 1; Charleston, S. C., 2; Savannah, 2; Birmingham, 1; New Orleans, 1; Dallas, 3.
Typhus fever.—Cases: New York, 1; Charleston, S. C., 7; Atlanta, 1; Savannah, 2; Birmingham, 1; Houston, 1; Los Angeles, 1.

FOREIGN AND INSULAR

CUBA

Provinces—Notifiable diseases—4 weeks ended August 21, 1937.—During the 4 weeks ended August 21, 1937, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer		3	2	16	1	1	23
Chicken pox		3					3
Diphtheria	4	18	1	2	1	4	30
Dysentery (amoebic)					3		3
Dysentery (bacillary)				2			2
Leprosy	1	6			2		9
Malaria	100	34	31	186	37	204	592
Measles	2	1	5				8
Poliomyelitis		1		1		4	6
Tuberculosis	51	37	34	75	17	28	242
Typhoid fever	14	64	32	55	21	28	214
Undulant fever		1					1
Yaws				1		1	2

CZECHOSLOVAKIA

Communicable diseases—June 1937.—During the month of June 1937, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	10		Paratyphoid fever	24	3
Cerebrospinal meningitis	9	3	Poliomyelitis	22	2
Chicken pox	160	1	Puerperal fever	28	10
Diphtheria	1,816	85	Scarlet fever	1,815	21
Dysentery	47	5	Trachoma	75	
Influenza	21		Tularaemia	2	
Lethargic encephalitis	3	2	Typhoid fever	419	21
Malaria	729				

FINLAND

Communicable diseases—July 1937.—During the month of July 1937, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	196	Poliomyelitis	20
Dysentery	1	Scarlet fever	498
Influenza	574	Typhoid fever	109
Paratyphoid fever	110	Undulant fever	1

JAMAICA

Communicable diseases—4 weeks ended September 4, 1937.—During the 4 weeks ended September 4, 1937, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis	1		Lethargic encephalitis		1
Chicken pox		34	Poliomyelitis		1
Diphtheria	3	1	Puerperal fever		2
Dysentery	2	3	Tuberculosis	30	70
Erysipelas		1	Typhoid fever	9	81
Leprosy		3			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for September 24, 1937, pages 1354-1368. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued October 29, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

China.—During the week ended September 11, 1937, cholera has been reported in China as follows: Hong Kong, 205 cases; Macao, 72 cases; Shanghai, 394 cases.

Plague

Dutch East Indies—Java—Pasoeroean.—During the week ended July 24, 1937, 1 case of plague with 1 death was reported in the mountain region near Pasoeroean, which is about 30 miles from Surabaya, Java.

Hawaii Territory—Island of Maui—Makawao District—Omaopio.—A rat found September 3, 1937, in Omaopio, Makawao District, Island of Maui, Hawaii Territory, has been found plague infected.

India.—During the week ended September 11, 1937, plague was reported in India as follows: Karachi, 4 cases; Sind State, 4 cases.

Indochina—Cochinchina—Sadec.—During the week ended September 11, 1937, 1 case of plague was reported in Sadec, Cochinchina, Indochina.

Yellow Fever

French Equatorial Africa—Fort Archambault.—On September 14, 1937, 2 cases of yellow fever, 1 of which was a suspected case, were reported in Fort Archambault, French Equatorial Africa.

Gold Coast—Apedwa.—On September 10, 1937, 1 fatal case of yellow fever was reported in Apedwa, Gold Coast.

Ivory Coast—Gaoua.—On September 9, 1937, 2 cases of yellow fever with 1 death were reported in Gaoua, Ivory Coast, and on September 14 another suspected case was reported in the same place.

Nigeria—Abeokuta.—On September 7, 1937, 1 fatal case of yellow fever was reported in Abeokuta, Nigeria.

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THE USE OF A DARK ADAPTATION TECHNIQUE (BIOPHOTOMETER) IN THE MEASUREMENT OF VITAMIN A DEFICIENCY IN CHILDREN[1]

By CARROLL E. PALMER, *Passed Assistant Surgeon*, and HAROLD BLUMBERG, *Associate Biochemist, United States Public Health Service*

INTRODUCTION

Evidence in recent literature indicates an increasing appreciation of the need, in practical nutrition work, for tests for the measurement of specific nutritional deficiencies. From the public health viewpoint the need for such tests is obvious, since administrative and remedial programs directed toward the eradication of nutritional defects must be predicated on definitive information concerning the nature, extent, and distribution of such deficiencies in the general population.

Among suggested methods, the quantitative dark adaptation test for measuring vitamin A deficiency constitutes one of the most promising developments in this field. Certain earlier work on this test was based on observations made with the Birch-Hirschfeld photometer, as described by Jeans and Zentmire (*1*) in 1934. In a survey of Iowa school children, Jeans and Zentmire (*2*) found that between 26 and 79 percent of the children examined had definitely subnormal dark adaptation measurements and therefore showed evidence of vitamin A deficiency. During the course of his studies I. O. Park (*3*, *4*, *5*) found a high prevalence of deficiency, 83 percent being given for one mixed group of adults and orphan Indian children in Oklahoma. Jeghers (*6*) found a 34 percent deficiency among supposedly healthy adults. Snelling (7), however, concluded that the Birch-Hirschfeld photometer was unsatisfactory for measuring small differences in dark adaptation.

The shortcomings of the Birch-Hirschfeld photometer have stimulated the development of a new instrument, the "biophotometer."[2] In a recent report on the development of the biophotometer test, Jeans, Blanchard, and Zentmire (*8*) essentially confirmed their previous findings and concluded that between 16 and 69 percent[3] of

[1] From the Division of Public Health Methods, National Institute of Health.

[2] Name given to instrument by the manufacturers, Frober-Faybor Co., of Cleveland, Ohio.

[3] Corrected from 26 and 79 percent according to this later work (*8*), in which it is reported: "When a larger and perhaps more reasonable degree of experimental error is allowed, the proportion of children with definitely subnormal adaptation becomes 10 percent less in each instance."

the previously surveyed children showed evidence of vitamin A deficiency. As a result of these reports and their obvious public health implications, investigations for the purpose of obtaining additional data on the use of the biophotometer test in general school health work have been undertaken. The present paper deals with an evaluation of certain aspects of the biophotometer test as a survey technique, especially in children.

THE BIOPHOTOMETER TECHNIQUE

The measurement of dark adaptation of the human eye, while relatively new as a practical health test, has been under investigation for a number of years. As a result of this work, techniques for the measurement of adaptation have been developed, and a not insignificant body of knowledge has accumulated regarding the mechanism of adaptation. It may be expected that this knowledge, which includes a considerable amount of observational and theoretical data, would be pertinent to the present problem involving the study of dark adaptation of the human eye. It is evident, however, that the dark adaptation measurements used for the vitamin A studies are largely empirical. Also, it is not yet possible to fit the results of more recent studies into preexisting facts and theories regarding the physiology of adaptation. While it is of great importance that these somewhat separate lines of investigation be correlated as soon as possible, the practical importance of the vitamin A studies undoubtedly justified further investigation in spite of a considerable number of apparent discrepancies between the newer studies and generally accepted facts regarding adaptation. In line with this view, the present paper will attempt no clarification of these apparent discrepancies. An attempt will be made only to evaluate briefly and in somewhat general terms the biophotometer test as an *empirical test*.

In brief, the biophotometer technique may be described as follows: The subject is placed in absolute darkness for a prescribed interval of time, at the end of which a preliminary measurement is made of the threshold or lowest intensity of light that is just perceptible to him. The subject is then asked to look directly at a bright light in order to "light-adapt" or "bleach" the eyes. After a short period of exposure to this light the subject is again placed in darkness, and, at stated intervals, measurements are made to determine the thresholds of light intensities.

The test is a simple one, and the general qualitative nature of the results is a matter of common knowledge. It is a matter of everyday experience that a relatively bright light cannot be perceived immediately after looking at a much brighter one and that the longer one remains in darkness, within limits, the less intense a light needs to be in order to be perceptible. In making quantitative measurements of

this physiological process, the biophotometer is used to obtain uniform conditions of exposure of the eyes to the bright light and for measuring the thresholds of light.

In evaluating the test merely as a test, it becomes necessary to consider the details of a number of steps in the experimental procedure. The first of these concerns the "bleaching" step. In the technique under discussion this consists of instructing the subject to look steadily, with both eyes open, for a period of 3 minutes, at a brightly illuminated ground glass screen within the biophotometer. A subject may or may not follow these simple instructions completely, and the operator has no definite way of knowing just how precisely the standard conditions of the test are being followed. With cooperative subjects, particularly adults, this part of the test probably is reasonably well controlled. Without the operator's knowledge, however, a subject may look at the black surfaces of the sides of the biophotometer or may even close the eyes during all or part of the period that he is instructed to gaze at the illuminated screen. Three minutes may seem a long time to some individuals, especially to children, and there can be little doubt that a considerable amount of variability in the results is possible and probable because of lack of rigorous control over this bleaching procedure. The present biophotometer test does not provide for the control of this variation, and it is difficult or perhaps impossible to make a quantitative evaluation of the amount or importance of this source of variability in routine use of the present instrument.

The second step in the test that needs particular attention concerns the determination of the thresholds of light perceived by the subjects under test. According to the standardized procedure adopted for the vitamin test, four threshold determinations are made, the first 20 to 30 seconds after the bright or bleaching light is turned out and the others at approximately 3-minute intervals, the last being made 10 minutes after bleaching. The steps in a threshold determination are as follows: The subject is asked to look at a black screen in the center of which is a quincunx of small circular openings which appear as disks of light. The intensity of the illumination of the five disks in the quincunx varies in two ways. First, a wedge placed between a source of light and the five openings in the black screen changes the intensity of light from right to left in such a way that the two right-hand disks appear the least bright, the center disk as of intermediate brightness, while the left-hand disks appear the brightest. The second mechanism for varying the illumination of the quincunx consists of an electric light connected in series with a rheostat which permits the variation of light intensity by turning the dial of the rheostat. The dial of this rheostat is marked off in arbitrary units from 0 to 100, and a table supplied with each biophotometer furnishes

data for converting each dial reading to a calibrated intensity of light, expressed in millifoot candles (mfc.) of the illumination of the center disk in the quincunx.

Since the essential results of the biophotometer test must be expressed in terms of these readings, it is pertinent to examine carefully the method of recording them. The first point for consideration in this connection concerns the arbitrary dial units, which consist of a simple arithmetic scale from 0 to 100. This scale actually represents an arbitrary logarithmic scaling of the light intensities as measured in millifoot candles. In actual practice, therefore, the thresholds of light intensities are observed on a scale which is a logarithmic scale of millifoot candles of light intensities. For the purposes of final uses of the readings, however, it is customary to convert the logarithmic values to an arithmetic scale. This procedure, that is, the taking of measurements on a logarithmic scale and the use of the measurements on an arithmetic scale, introduces a question of mensuration which has considerable import in the final interpretation of results. An example will illustrate this point. In one biophotometer used in the work an arbitrary dial reading of 5 is equivalent to a mfc. reading of 4.7, and a dial reading of 6 is equivalent to 4.4 mfc. The difference between these two dial readings equals, therefore, one dial unit or 0.3 mfc. On the same biophotometer a dial reading of 80 is equivalent to 0.0035 mfc. and a dial reading of 81 is equivalent to 0.0032 mfc. The difference between these two successive dial readings is, therefore, one dial unit,[4] but at this light intensity this equals only 0.0003 mfc., or about one-thousandth the light intensity difference at the higher range of the scale. Thus, equal changes on the dial scale represent very different changes on the mfc. scale and serve to raise the question as to what scale measures most precisely the physiological function desired in the test.

Obviously, it may be difficult to determine the most effective physiological scale; and in line with the expressly stated purpose of this paper, no attempt will be made to consider this question in detail. On the other hand, the necessary consequences of the method adopted for recording the biophotometer readings must be considered. Consideration of this matter is forced when an attempt is made to determine the reliability and consistency of biophotometer test readings. A simple example will illustrate this point. In making preliminary tests with adults, it was found that changes of one or two arbitrary dial units are usually just perceptible to the eye of a presumably normal person when the threshold is at the level of about 25 dial units. In this range of threshold values, it is apparent that the eye is distinguishing between mfc. values of approximately 0.63 and 0.76. When,

[4] It may be important to note that no attempt can be made to read intensity values to proportionate parts of a single dial unit. The practical reason for this will be brought out later.

however, the threshold values are near the level of 80 dial units, it becomes apparent that the eye is capable of distinguishing only the difference between 3 to 4 dial unit changes, or approximately the difference between 0.0035 and 0.0052 mfc.

These observations indicate that measurement of the physiological process is approximately accurate from one to two arbitrary dial units (logarithms of mfc.) at one end of the range of the physiological process and about four dial units at the other end of the range. On the mfc. scale, measurement of the physiological process, on the other hand, is accurate to 0.13 mfc. at one end of the range and 0.0017 mfc. at the other end. In terms of logarithms of mfc., therefore, measurements are about twice as accurate at one end as at the other end of the scale, while in terms of actual mfc., measurements are roughly 100 times as accurate at one end as at the other end of the scale. It would be advantageous if the same scale units had the same meaning with respect to the precision of measurements over the entire range of experience of measurements. Obviously, neither the dial units (logarithms of mfc.) nor the mfc. units themselves fill this need, and it is apparent that a study of the accuracy or precision of the threshold measurements cannot be made on either of these scale units without considering the level of the threshold intensities. Since it seems necessary for present practical purposes to select one of these scales, the advantages of the logarithms of the mfc. definitely make this scale preferable.

The third characteristic of the biophotometer test that requires consideration also deals with the determination of the thresholds of light perceived. While being tested the subject is shown the quincunx of light spots and is asked to tell the operator at what light intensity the center spot of the quincunx is just visible. According to the method proposed for the test, the operator reduces the light intensity of the quincunx until the subject says that only the two left hand spots are visible and then increases the light intensity until the subject says he just perceives the center spot. The reading on the biophotometer scale at this point is then recorded as the threshold for that particular trial. The important fact to be emphasized at this point is that the basic reading of the test depends upon a subjective judgment by the person being tested.

Two extremely important considerations arise in connection with this subjective characteristic of the test. According to the present design of the biophotometer, the operator of the test has no way of knowing whether or not the subject actually "sees" the critical spot of light. Most subjects will obviously give a truthful answer regarding the perception of the light, but the operator has no way of knowing what criteria the subject employs in perceiving the threshold, and considerable variation may arise because of the difficulties encountered,

especially by children, in describing the critical point of the test. Some individuals will report that they perceive the light when it is very indistinct indeed and even when there may be some doubt in their minds that they actually see it. Other individuals—and ordinarily the operator would be quite unable to say which individuals these are—may report seeing the test light only if it is very distinctly visible. This last difficulty is not unique for the biophotometer test; it is basic in the determination of any sensory threshold.

From one point of view, however, the uses made of the adaptation test for vitamin A nutrition are different from the uses most often made of a sensory threshold measurement. Determinations of thresholds of auditory acuity, for example, are made usually for the purpose of determining effective hearing; and if one individual requires a more distinct sound than another in order to report a sensory perception, the effective hearing of the former probably is actually less than that of the latter. The determination of the light threshold in the biophotometer test, on the other hand, is made only for its indirect value in diagnosing the state of vitamin A nutrition. For example, suppose an individual consistently, over a long series of tests, requires a rather bright light for the threshold measurement. Is this due to a low or subnormal adaptation, or does it represent, to a certain extent, a different interpretation of what the threshold means? Also, is a person giving such results on the test, who is on a high and adequate vitamin A diet, "refractory" to vitamin therapy, or is he, in some degree, showing a different interpretation of threshold values? Such questions clearly indicate the complexity of the biophotometer tests and exemplify the caution that is necessary in interpreting the results of the adaptation measurement as showing the status of vitamin A nutrition.

The biophotometer test, however, resembles other sensory threshold tests in its subjective character. The significant implications of this similarity have not been emphasized in reports on the biophotometer, since very little attention has been given to the evaluation of two important characteristics of such subjective tests: First, the high individual variability; and, second, the "practice" or "learning" factor which has been found in some other types of threshold measurements. The accumulated experience of a large amount of physiological and psychological work on other threshold tests indicates the importance of analyzing the amount and sources of variations before the measurement of an individual can be considered as reliably characteristic of that individual. The same work also indicates the tremendous importance of repeated tests on the same individual in order to establish the reliability of an individual's threshold measurement.

The above considerations are sufficient, it would seem, to indicate certain basic characteristics of the biophotometer test as a test and to show the difficulties inherent in interpretations of the test as a method of measuring, even empirically, vitamin A nutrition.

INTERPRETATION OF BIOPHOTOMETER TESTS IN THE MEASUREMENT OF VITAMIN A NUTRITION

According to the report of Jeans and coworkers (*8*), a classification of individuals with respect to vitamin A nutrition can be based on readings of the thresholds of light intensities determined with the biophotometer. These workers indicate that the primary basis of this classification depends on the threshold found at the "first", and sometimes at the "last", recovery reading. The "first" recovery reading is made in the interval 20 to 30 seconds after light-adapting, or "bleaching", the eyes; the "last" recovery reading is made 10 minutes after light-adapting the eyes. While it is indicated further that other threshold readings are considered in making a final diagnosis of the state of vitamin A nutrition, the use of such other readings is not clearly explained. The classification of individuals on the basis of "first" and "last" recovery reading into three groups, "normal", "borderline", and "subnormal", is shown in table 1.

TABLE 1.—*Millifoot candle (mfc.) values used for classifying biophotometer tests*

Classification	"First recovery" (20-30 seconds)	"Last recovery" (10 minutes)
"Normal"	0.6 mfc. or below	0.05 mfc. or below.
"Borderline"	0 6-1.0 mfc.	0 05-0.10 mfc. (implied).
"Subnormal"	Above 1.0 mfc.	Above 0.10 mfc. (implied).

The report of Jeans and coworkers is interpreted as indicating that an individual is classified as "borderline" or "subnormal" if either the "first" or the "last" recovery reading deviates from "normal." For example, if either the first or last reading falls into the range designated as "subnormal", the individual is classified in the "subnormal" group; if either the first or last reading falls into the "borderline" class but neither falls into the "subnormal" class, the individual is classified in the "borderline" group, and if neither reading falls below the ranges of the "normal" class, the individual is classified as "normal."

THE PRESENT STUDY

Data available for this report include, among other observations, the results of biophotometer tests on 585 children who were in attendance in the third to the eighth grades of the elementary schools in Maryland and the District of Columbia during the winter and

spring of 1936–37. Of these children, 177 were from a consolidated school in a rural mountainous area in western Maryland, 279 were from public schools in a small city in central Maryland, and 129 were urban children in the District of Columbia. Both Maryland groups were composed principally of children from families of low economic level, and the urban group was made up of children from institutional homes. The selection of children for the test was made merely on the basis of presence in the school at the time of the examination. Since it was apparent that satisfactory testing cannot be accomplished generally in children below the second grade, the work was begun in the third grade and continued in successively higher grades as time permitted. The method of making the tests followed in detail the technique described by Jeans, Blanchard, and Zentmire (*8*).

For the purpose of comparing the results obtained in this survey with those obtained in Iowa, the classification of tests proposed by Jeans and coworkers is used for reporting the data shown in table 2. In general, the results of the surveys in the midwestern and eastern localities are roughly comparable with respect to the proportion of adaptation tests classified as "subnormal." The proportions of individuals falling into the "borderline" class seem to be definitely higher in the eastern group, while the proportions falling into the "normal" group are generally lower. These results would appear to indicate that the differences between the midwestern and eastern localities, and between the subgroups within the two localities, are greater than are likely to arise fortuitously.

TABLE 2.—*Comparison of results of biophotometer tests in school children*

Classification	Maryland and District of Columbia, 585 children			Iowa,[1] 404 children		
	Rural	Small city	Urban	Rural	Village	Urban
	PERCENT OF CHILDREN					
"Normal"	33	11	23	64	37	34–11
"Borderline"	59	32	35	20	20	20
"Subnormal"	8	57	42	16	43	[2] 46–69
Total	100	100	100	100	100	100
	NUMBER OF CHILDREN TESTED					
	177	279	129	100	102	202

[1] From the survey report of Jeans and Zentmire (*2*), but corrected as indicated by Jeans and coworkers (*8*) for conversion into biophotometer results. (See footnote 3, p. 1403.)
[2] Upper economic level 46 percent; middle 53 percent; and lower 69 percent.

A number of points may be raised as possible explanations of the differences. The first of these considerations involves a quantitative study of the errors of measurement of the biophotometer test.

Obviously, a sufficiently complete analysis of errors of measurement of the complex series of measurements that make up the complete biophotometer test would alone require a very extensive investigation. Neither our own work nor that of others reported in the literature is sufficient, as yet, for such an analysis, so that any present evaluation of the precision of the measurements in the interpretation of results must be based on a few general and somewhat unsatisfactory considerations.

As has already been mentioned, preliminary observations with the biophotometer indicate that, in the middle range of light intensity measurements, most individuals are usually able to define their thresholds within a range of one to two arbitrary dial units, but in the range of the lowest light intensity, they are usually able to define their thresholds within about four arbitrary dial units. What do these simple observations mean with respect to the precision of classification of individuals into the groupings, "normal", "borderline", and "subnormal"? An answer to this single question alone requires an analysis and evaluation of readings that present difficult and time-consuming statistical and experimental work. It must be sufficient at this point, therefore, to indicate that in many cases the classification of an individual into the "subnormal" rather than the "borderline" class or into the "borderline" rather than the "normal" class depends upon a subjective judgment of the threshold of light. This, in turn, means the differentiation of one dial unit of intensity in a situation where it is impossible for the ordinary subject to differentiate between two dial units of light intensity.

Another significant part of the evaluation of the reliability of the measurements, and one which at this time can be answered only in very general qualitative terms, concerns the variation in tests made in immediate succession. In their report on the development of the biophotometer, Jeans and coworkers have indicated that the experimental error is not great enough to interfere with proper interpretation of results. Although very little quantitative data are given, it appears that a variation of 4 dial units, or 0.2 mfc., may occur in the "first" recovery reading during successive tests of a child classified as "normal" according to the proposed criteria. Our preliminary work indicates that a variation of approximately 4 dial units, or 0.2 mfc., occurs very frequently in the readings of a cooperative adult whose threshold falls in the "normal" range, and that a variation of approximately 4 dial units or 0.3 mfc. occurs frequently in successive readings of an adult whose threshold falls in the "borderline" range. Part of this variation is, of course, the "error of measurement" inherent in a single biophotometer test, but a significant part is probably due to physiological variation of the individual. Our preliminary observations on cooperative subjects suggested that the test-to-test

variation in children may well be as much as 5 or 6 dial units (0.4 or 0.5 mfc.), a difference sufficient to cause changes of classification from "subnormal" to "borderline", or even from "subnormal" to "normal" in a succession of only 3 or 4 tests.

In their recent report Jeans, Blanchard, and Zentmire (8) have indicated that a single biophotometer test is probably not sufficient to establish the fact of deficiency in an individual child. In order to test further the significance of this suggestion, 247 of the children [5] previously surveyed were retested within a few days after the initial test. The second testing gave results which, when classified according to the specified groupings, produced a new arrangement of the children. The classification of the data for the first and second tests is shown in table 3. It may be noted that the percentage of "subnormal" tests is decreased from 56.3 to 35.6 percent simply by testing a second time. This marked change on the second test in the proportion of children included in the various groups suggested the value of more successive tests in order to determine whether or not still further changes would occur. Accordingly, 100 subjects, among whom were included practically all of those with decidedly "subnormal" readings, were given a sequence of four tests. These were usually made twice a week over a 2-week period. The classifications of results from the first and fourth tests are shown in table 4.

TABLE 3.—*Classification of children on the basis of first and second biophotometer tests (247 children)*

Classification	Number of children		Percent of children		Proportionate change, first to second test
	First test	Second test	First test	Second test	
"Normal"	26	50	10.5	20.3	93 percent increase.
"Borderline"	82	109	33.2	44.1	33 percent increase.
"Subnormal"	139	88	56.3	35.6	37 percent decrease.

TABLE 4.—*Classification of children on basis of first and fourth biophotometer tests (100 children)*

Classification	Number of children		Proportionate change, first to fourth test
	First test	Fourth test	
"Normal"	9	26	189 percent increase.
"Borderline"	32	45	41 percent increase.
"Subnormal"	59	29	51 percent decrease.

It is apparent from these figures that retesting causes a very significant improvement in the readings, so that, after a sequence of four tests, the proportion of children falling into the group designated as "subnormal" is only about one-half that obtained on the basis of a single test.

[5] In the selection of these 247 children an attempt was made to include as many as possible of those who gave "subnormal" readings on the first test.

These significant changes suggest the presence of what may be termed the "practice" or "learning" factor, which is frequently encountered in threshhold measurements. In order to obtain more specific data on this question a group of 41 children, consisting principally of those whose initial tests were classified in the "subnormal" or "borderline" groups, were given a sequence of eight tests, extending over a period of approximately 5 weeks. A detailed analysis of the results of the eight sequence testings is given in tables 5 and 6; and, in order to present the changes more clearly, the results of the "first" and "last" recovery readings are given separately. On the left-hand side of table 5 is given frequency distribution, for the "first" recovery reading on each of the eight successive tests, of the number of children whose readings fell at each dial and mfc. level provided for on the biophotometer scale. On the right-hand side of this table are given the percentage distributions of the results accumulated from the highest to the lowest mfc. values. Precisely similar data are given in table 6 for the "last" recovery reading, which Jeans and coworkers regard as a secondary criterion.

TABLE 5.—*Frequency distributions of "first recovery" biophotometer readings, 8 successive tests*

Biophotometer readings			Actual frequency Number of children								Accumulated frequency Percent of children							
			Test								Test							
	Dial units	mfc.[1]	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth
"Subnormal"	8	3.50	1								2							
	9	3.15									2							
	10	2.90	1							1	5							2
	11	2.60			1						5		2					2
	12	2 40		2			1				5	5	2		3			2
	13	2.16	2							1	10	5	2		3			5
	14	1 95			1		1				10	5	5		5			5
	15	1.80	6	1	2	2	1			2	24	8	10	5	8			10
	16	1.60	2		1		1	1	2		29	8	12	5	10	3	5	10
	17	1.48	2	2			1			1	34	13	12	5	13	3	5	12
	18	1.36	1	4	3	4	1	2	1		37	23	20	15	15	8	8	12
	19	1.22	2	1	2		1		1		41	25	24	15	18	8	11	12
	20	1.10	5	7	5	7	2	5	3	2	54	43	37	32	23	20	18	17
"Borderline"	21	1.00	7	4	4	1	4	1	3	2	71	53	46	34	33	23	26	22
	22	.92	2	4	2	5	5	8	4		76	63	51	46	46	43	37	22
	23	.84	2	5	5	4	2	3	3	3	80	75	63	56	51	50	45	29
	24	.76		2	2	4	5	3	3	4	80	80	68	66	64	58	53	39
	25	.69	2	4	3	3	2	5	4	4	85	90	76	73	69	70	63	49
"Normal"	26	.63	2	3	1	3	5	1	2	4	90	98	78	80	82	73	68	59
	27	.58	1		4	2	2	2	4	3	93	98	88	85	87	78	79	66
	28	.52	1		3	3		2	1		95	98	95	93	87	83	82	66
	29	.47			1	2		2	1	3	95	98	98	98	87	88	84	73
	30	.44	2	1	1	1	2	3	2	3	100	100	100	100	92	95	89	80
	31	.38					2		1	2					97	95	92	85
	32	.35							1	2					97	95	95	90
	33	.315						1	2						97	98	100	90
	34	.290						1		1					97	100		93
	35	.260								1					97			95
	36	.240								1					97			98
	37	.216					1								100			98
	38	.195								1								100
Total			41	40	41	41	39	40	38	41								

[1] mfc. = millifoot candles.

TABLE 6.—*Frequency distributions of "last recovery" biophotometer readings, 8 successive tests*

Biophotometer readings			Actual frequency Number of children								Accumulated frequency Percent of children							
			Test								Test							
Dial units		mfc [1]	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth
	28	0.52	1	----	----	----	----	----	----	----	3	----	----	----	----	----	----	----
	29	.47	----	----	----	----	----	----	----	----	3	----	----	----	----	----	----	----
	30	.44	----	----	----	----	----	----	----	----	3	----	----	----	----	----	----	----
	31	.38	----	----	----	----	----	----	----	----	3	----	----	----	----	----	----	----
	32	.35	----	----	----	----	----	----	----	----	3	----	----	----	----	----	----	----
	33	.315	----	----	----	1	----	----	----	----	3	----	----	3	----	----	----	----
	34	290	----	----	----	----	----	----	----	----	3	----	----	3	----	----	----	----
	35	.260	----	----	----	----	1	----	----	1	3	----	----	3	3	----	----	2
"Subnormal"	36	.240	----	----	----	----	----	----	----	----	3	----	----	3	3	----	----	2
	37	.216	----	----	----	----	----	----	----	----	3	----	----	3	3	----	----	2
	38	.195	----	----	----	----	----	----	1	----	3	----	----	3	3	----	3	2
	39	.180	----	----	----	----	----	----	1	----	3	----	----	3	3	----	5	2
	40	.160	3	1	1	1	----	1	----	1	10	2	2	5	3	2	5	5
	41	.148	----	----	----	----	1	----	----	----	10	2	2	5	5	2	5	5
	42	136	----	----	----	----	----	----	----	1	10	2	2	5	5	2	5	7
	43	.122	1	----	----	1	----	----	----	----	13	2	2	8	5	2	5	7
	44	.110	----	3	1	----	----	----	----	----	13	10	5	8	5	2	5	7
	45	.100	1	1	1	1	----	2	----	1	15	12	7	10	5	7	5	10
	46	.092	----	1	1	----	----	2	----	----	15	15	10	10	5	12	5	10
	47	.084	1	----	1	----	1	----	----	1	18	15	12	10	8	12	5	12
"Borderline"	48	.076	1	----	----	----	----	----	----	1	20	15	12	10	8	12	5	15
	49	.069	----	----	1	1	1	----	----	1	20	15	15	13	11	12	5	17
	50	.063	3	1	2	2	----	2	2	1	28	17	20	18	11	17	11	20
	51	.058	2	1	----	1	----	----	1	----	33	20	20	20	11	17	13	20
	52	.052	2	3	2	2	----	----	----	----	38	27	24	25	11	17	13	20
	53	.047	----	3	----	3	----	----	3	2	38	34	24	33	11	17	21	24
	54	.044	1	2	3	1	----	1	1	----	40	39	32	35	11	20	24	24
	55	.038	5	3	7	1	----	1	1	2	53	46	49	38	11	22	26	29
	56	.035	----	2	2	----	----	4	2	----	53	51	54	38	11	32	32	29
	57	.0315	2	3	2	2	4	1	2	----	58	58	59	43	21	34	37	29
	58	.0290	1	----	3	1	4	4	----	1	60	58	66	45	32	44	37	32
	59	.0260	----	----	2	1	2	----	4	3	60	58	71	48	37	44	47	39
	60	.0240	2	5	2	1	2	3	----	1	65	71	76	50	42	51	47	41
	61	.0216	3	----	1	3	2	2	----	2	73	71	78	58	47	56	47	46
	62	.0195	2	2	1	1	3	1	1	4	78	76	80	60	55	59	50	56
	63	.0180	4	2	----	----	1	1	----	2	88	80	80	60	58	61	50	61
	64	.0160	----	----	----	3	----	3	2	2	88	80	80	68	58	68	55	66
	65	.0148	----	2	----	2	3	4	2	2	88	85	80	73	66	78	61	71
	66	.0136	2	1	----	3	3	1	1	2	93	88	80	80	74	80	63	76
	67	.0122	1	2	2	2	1	----	1	----	95	93	85	85	76	80	66	76
"Normal"	68	.0110	----	1	----	2	3	3	1	2	95	95	85	90	84	88	68	80
	69	.0100	----	----	2	1	----	1	2	2	95	95	90	93	84	90	74	85
	70	.0092	1	1	2	----	3	2	4	1	98	98	95	93	92	95	84	88
	71	.0084	----	----	2	----	----	1	----	2	98	98	100	93	92	98	84	93
	72	.0076	----	----	----	1	----	----	2	----	98	98	----	95	92	98	89	93
	73	.0069	----	----	----	----	----	----	----	1	98	98	----	95	92	98	89	95
	74	.0063	----	----	----	----	----	1	----	----	98	98	----	95	92	100	89	95
	75	.0058	1	1	----	1	1	----	3	1	100	100	----	98	95	----	97	98
	76	.0052	----	----	----	----	1	----	----	----	----	----	----	98	97	----	97	98
	77	.0047	----	----	----	----	----	----	----	----	----	----	----	98	97	----	97	98
	78	.0044	----	----	----	1	----	----	----	----	----	----	----	100	97	----	97	98
	79	.0038	----	----	----	----	----	----	----	----	----	----	----	----	97	----	97	98
	80	.0035	----	----	----	----	1	----	----	----	----	----	----	----	100	----	97	98
	81	.0032	----	----	----	----	----	----	----	----	----	----	----	----	----	----	97	98
	82	.0029	----	----	----	----	----	----	----	----	----	----	----	----	----	----	97	98
	83	.0026	----	----	----	----	----	----	----	----	----	----	----	----	----	----	97	98
	84	.0024	----	----	----	----	----	----	1	1	----	----	----	----	----	----	100	100
Total			40	41	41	40	38	41	38	41								

[1] mfc. = millifoot candles.

An example may facilitate the reading of these tables. Thus on the first test (table 5, left-hand section) one child gave a "first" recovery reading of 8 dial units, or 3.5 mfc.; another child gave a reading of 2.90 mfc.; two children gave readings of 2.16 mfc.; and so on. On the

right-hand side of this table, in the column marked "first test", the frequency of cases is accumulated in percentages. For example, 2 percent of the children gave readings of 3.50 mfc. or more; 5 percent of the children gave readings of 2.90 mfc. or more; and 10 percent of the children gave readings of 2.16 mfc. or more. The accumulation of the frequency percentages permits, therefore, a statement of the percentage of cases which fall on or above any specified mfc. value. Thus, the percentage of children who are above the 1.0 mfc. value, one of the criteria specified as marking the lower limit of the class designated as "subnormal", is 54 on the first test. It may be observed that these children, classified as having readings above 1 mfc., are automatically, by the proposed classification, designated as giving "subnormal" dark adaptation tests. According to the proposed interpretation of the tests, therefore, these children are deficient in vitamin A. On the second test 43 percent of the children fell into this class. In each succeeding test the proportion of children designated in the "subnormal" class decreases as shown in the table and finally, on the eighth and last test, only 17 percent of the children are placed in this group. Thus, after eight successive tests the proportion of children falling into the class designated as "subnormal" is reduced from 54 percent to 17 percent. A consideration of the proportion of cases classified as "normal" also shows the significant effect of "practice" or "learning." Thus, on the first test only six children were classified as "normal", but on the eighth test 21, or more than 50 percent, were so classified.

It is of considerable interest to find, also, that two of the seven children comprising the 17 percent in the designated "subnormal" class on the eighth test were in the "borderline" group in the first test. Thus it is seen that, although the general trend of measurements is toward improvement, the marked variations which are observed result in very significant rearrangement of children in the successive classifications. This illustrates the variability inherent in these tests, a consideration of which will receive full treatment in a subsequent paper. However, the data given here show that, in spite of the observed variabilities, very definite improvement occurs, on the average, in successive tests.

During the preceding analysis of the significance of the learning factor, the standards proposed by Jeans and coworkers (*cf.*, table 1) were used for the classification of subjects as "normal", "borderline", and "subnormal", with respect to dark adaptation. Since "subnormal" dark adaptation is taken to indicate vitamin A deficiency, it is of importance to inquire into the validity of these critical values in relation to this interpretation. The most direct way of demonstrating a relationship between the dark adaptation test and vitamin A would appear to be through feeding the vitamin to subjects with "subnormal" readings and observing any changes. Feeding experiments of

this kind were reported by Jeans and Zentmire *(2)* in their study with the Birch-Hirschfeld photometer. Although the great majority of the children were found to be normal when examined after the vitamin administration, the Iowa workers commented upon a few subjects who did not give normal readings despite the absence of any demonstrable ophthalmological or other abnormality. These few exceptions indicate either that the vitamin A ingested by these children was not utilized or that a "subnormal" dark adaptation test does not necessarily indicate vitamin A deficiency.

In the present survey the actual relationship between the biophotometer reading levels and vitamin A deficiency was investigated by means of a supplementary feeding experiment carried out during the months of February, March, and April 1937. The complete details of the experiment will be reported at a later date. At this point, however, it must be mentioned that of 25 children who gave rather consistent "borderline" or "subnormal" readings before the feeding was begun, 16 still did not give normal readings at the end of the feeding period of 6 to 8 weeks. During this time the dosage of vitamin A, given in the form of halibut liver oil capsules, was 18,000 International Units per day, which is equivalent to more than 8 teaspoonfuls of U. S. P. cod liver oil daily and far in excess of a child's estimated requirements. The total vitamin A intake of each child was 756,000 units during the 6-week period, and 1,008,000 units during the 8-week period. When the experiment was concluded, two of the children gave readings of 1.1 mfc. on the "first" recovery reading. This value is slightly within the range of "subnormal" dark adaptation ("subnormal" values are those above 1.0 mfc., cf. table 1), according to the standards of Jeans and coworkers. The other 14 children gave "borderline" readings, that is, from 0.6 to 1.0 mfc. These results demonstrated that an appreciable proportion of the children failed to attain or maintain biophotometer readings within the so-called "normal" range despite the prolonged ingestion of ample vitamin A.

It is possible that the vitamin A ingested was not utilized, but it seems highly improbable that so many apparently healthy subjects, free from gross visual defects, would fail to use a significant amount of the excess administered. Since all of the refractory cases were those in which the departures from "normal" were in the "first" recovery reading alone and which were "normal" by the "last" recovery reading, it appears that the range of "normal" should be extended if the first recovery reading, which hitherto has been considered of primary importance, is to be used as a criterion. On the basis of the feeding experiment, in which 18,000 I. U. per day must be regarded as a more than adequate dosage, "normal" readings may be as high as 1.1 mfc. These results constitute strong evidence

against the validity of the standards of classification that have been proposed.

DISCUSSION

In consequence of the foregoing data on the marked improvement associated with the "learning" factor, the marked variability in successive tests, and the strong evidence against the validity of the critical standards themselves, it is obviously impossible to make any definite statement regarding the incidence of vitamin A deficiency in the Maryland and District of Columbia school groups on the basis of the biophotometer tests. The biophotometer surveys certainly provide no evidence for believing vitamin A deficiency to be prevalent among the groups of school children examined.

This study has been concerned only with an investigation of the biophotometer technique as an empirical test for vitamin A deficiency, without regard for theoretical considerations. However, it is interesting to point out in discussion that the biophotometer dark adaptation test is said to be based upon the measurement of the rate of regeneration of the retinal visual purple, which in turn is considered a measure of the state of vitamin A nutrition of the body. It may be mentioned that, according to present knowledge of the subject (*cf.* review by Hecht (*9*)), the instrument and the test are poorly designed for the purpose. Perhaps a more satisfactory apparatus for measuring the regeneration of visual purple might permit the development of a reliable and sensitive routine test for moderate vitamin A deficiency in children.

It must be emphasized again that this work has been directed toward an investigation of the biophotometer test as a survey technique for detecting subclinical vitamin A deficiency among supposedly normal school children. Perhaps the test may become more consistent and reliable when used in the clinic in conjunction with other examinations. With individual attention the subject may be given a sufficient number of preliminary tests to insure the reliability of the measurements, and the results might be correlated with determinations of vitamin A in blood (*10*). More data concerning the quantitative relationships between vitamin A nutrition and dark adaptation tests are needed. At the present time, however, the biophotometer test does not appear to be a reliable method for application to the routine survey of school children.

In a subsequent paper further data will be presented on the analysis of variability in readings and on the detailed results of feeding experiments.

SUMMARY AND CONCLUSIONS

The biophotometer dark adaptation test has been used in surveys of 585 elementary school children in Maryland and the District of

Columbia. Considerable improvement in readings, apparently due to a learning factor, resulted from the repeated testing of sample groups and demonstrated that little dependence could be placed upon survey results obtained from a single test of each child. In addition to the learning factor, significant variability occurred in successive tests. As a result of feeding experiments, evidence was presented against the validity of present standards for interpreting results in terms of vitamin A deficiency.

The uncertainties of the learning factor, variability, and doubtful standards made it impossible to state definitely the incidence of deficiency in the groups surveyed. However, the survey results gave no evidence for believing that vitamin A deficiency was prevalent among the school groups studied. The biophotometer test does not appear to constitute an accurate or reliable technique for detecting mild degrees of vitamin A deficiency in the routine survey of school children.

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STUDIES ON CHRONIC BRUCELLOSIS

II. Description of Techniques for Specific Tests

By ALICE C. EVANS, *Senior Bacteriologist, National Institute of Health, United States Public Health Service*

The plan of the three field investigations carried on by the National Institute of Health to determine the prevalence of chronic brucellosis was outlined in the first paper of this series. Altogether somewhat more than a thousand patients were examined for evidence of *Brucella* infection. Three specific tests were used to aid in diagnosis—the agglutination, opson-ocytophagic, and intradermal reactions. The techniques used in carrying out the tests are described in this paper. The significance of data obtained will be discussed in another paper of this series.

THE AGGLUTINATION TEST

The field investigators separated the blood serum from the clot, added an equal quantity of sterile glycerine, and mailed the samples to the central laboratory. The serums as received were, therefore, in a dilution of 1:2. They were tested for agglutinins serially in final dilutions of 1 to 10, 20, 40, 80, 160, 320, 640, and 1,280. The dilutions were made as follows: In the first tube of the series was placed 0.4 cc of the serum mixture and 0.6 cc of saline solution. The next dilution was made by carrying 0.5 cc to a tube containing 0.5 cc of saline solution, and so on until the dilution reached 1:640 in the last tube. From the last tube of the series 0.5 cc of the diluted serum was removed to an agglutinating tube and kept for further possible use. The addition of 0.5 cc of antigen to each tube of the series brought the serum to the desired dilutions.

All serums were tested for specific agglutinins against two *Brucella* antigens, prepared with variety *abortus* No. 456 and variety *melitensis* No. 428, respectively. These two strains have been used for many years in this and other laboratories for the preparation of antigens for serological studies.

On account of the cross agglutination reactions between *Brucella* and *Bact. tularense* all serums were also tested for agglutination of *Bact. tularense* antigen. Those giving a positive reaction with the *tularense* antigen and also with the *Brucella* antigens were regarded as

having come from cases of tularaemia if the titer with the *tularense* antigen was the higher.

The *Brucella* cultures were grown in Blake bottles on beef infusion agar containing 1 percent glucose. Each bottle was inoculated with the entire growth from one agar slant suspended in about 1.5 cc of physiological saline solution. Incubation was at 37° C. for 2 days. After the incubation, 15 cc physiological saline solution containing 0.5 percent formalin was added to each bottle, and the growth was washed from the agar by rocking the bottle in the hands. The dense bacterial suspension was removed to centrifuge tubes, and after standing in the refrigerator a few days it was centrifuged, the clear supernatant fluid was discarded, and saline solution containing 0.5 percent formalin was added to bring the turbidity to 20,000 parts per million of the silica standard. As needed, this suspension was further diluted (39 parts of saline solution to 1 part of antigen) to prepare the agglutinating antigens of a density equivalent to 500 p. p. m. of the silica standard. The *tularense* antigen of a density equivalent to 500 p. p. m. of the silica standard was prepared according to the method described by Francis.

For the test, 0.5 cc of the diluted antigen was added to each of the series of tubes containing an equal quantity of diluted serum. The tubes were placed in a water bath at 37° C., and at the end of an hour they were examined. If agglutination had occurred in the 1:640 dilution, it indicated that the titer would be high. In that case the 0.5 cc of diluted serum which had been set aside was further diluted serially and antigen was added. In this additional series the highest final dilution of the serum was 1:20,400. The racks of tubes were then replaced in the water bath and incubated 1½ hours longer, then they were removed to the refrigerator, where they remained until the next morning, when the readings were made. Complete sedimentation of antigen with clear supernatant fluid was indicated by 4; supernatant turbidity as in control tubes containing 25, 50, or 75 percent of antigen was designated by 3, 2, or 1. Readings of 4 and 3 were interpreted as positive; readings of 2 and 1 were interpreted as slightly positive.

In the great majority of positive samples the agglutinin reactions with the *melitensis* and *abortus* antigens were in the same dilution or differed by only one step in the series. In the case of 16 serums (1.6 percent) there was a more marked difference in the titers as determined by the two antigens. For example, one serum reacted with the *abortus* antigen in the 1:80 dilution, but failed to react with the *melitensis* antigen. Another serum reacted with the *melitensis* antigen in the 1:40 dilution but failed to react with the *abortus* antigen.

THE OPSONO-CYTOPHAGIC TEST

As compared with Neufeld's bacteriotropin test, or Wright's opsonic test, the technique of the opsono-cytophagic test is less exacting because the leucocytes remain suspended in the sample of blood tested. It proved to be practical in the field; for, on the whole, all three workers obtained consistent results, although all occasionally sent slides too unsatisfactory for reading. Huddleson's technique was followed with certain modifications.

All glassware was clean and sterile.

The blood specimens were collected in 5 cc amounts in tubes containing 0.2 cc of a 20 percent solution of sterile sodium citrate in physiological saline solution. The test was carried out within 6 hours after collection. The specimens were shaken thoroughly before mixing with the bacterial suspension.

The bacterial suspension was freshly prepared from 48-hour glucose agar cultures of *Brucella melitensis* variety *abortus*, No. 456. The growth was taken up in sterile physiological saline solution of pH 7.0 and adjusted to a density equivalent to 600 p. p. m. of the silica standard.

The test was carried out in agglutination tubes. To 0.1 cc of the citrated blood was added 0.1 cc of bacterial suspension. After thorough mixing, the tubes were placed in a water bath at 37° C. for 30 minutes.[1] Directly after removing the tubes from the water bath, a small amount of the sedimented cells was removed with a finely drawn capillary pipette. A large drop of the cell suspension was placed near one end of a thoroughly cleaned and polished glass slide and a spread was made in the usual way by dragging the drop over the slide by means of another slide held at an angle, stopping about a half inch from the end of the slide. Then the top slide was dragged back, this time being held loosely. The best smears were obtained if the movement was "nervous", giving a wavy, uneven spread.

The slides were dried as quickly as possible under an electric fan in front of an electric heater.[1] They were then treated to dissolve the red cells by immersion for 3 or 4 minutes in a solution containing 1 percent acetic acid and 5 percent formalin in distilled water. They were then rinsed off, blotted gently on bibulous paper, and stained.

The slides were stained with Bordet-Gengou's carbol toluidin blue.[2] Slides stained for about 15 seconds show the deeply stained nuclei of the leucocytes and the deeply stained bacteria on a clear background.

[1] Due to lack of equipment, some of the field workers modified the technique by using an incubator instead of a water bath, and by drying slides without the use of an electric heater.

[2] Bordet-Gengou's carbol toluidin blue is made by dissolving 5 grams of toluidin blue in 100 cc of alcohol, 500 cc of distilled water, and 500 cc of 5-percent phenol. One part of this dye is diluted with two parts of distilled water for staining the smears.

In the technique described, Huddleson's method of carrying out the opsono-cytophagic test was modified in turbidity standard, in the preparation of the smears, in the staining of the slides, in making the readings, and in interpreting the results. A discussion of all these modifications follows.

Turbidity standard.—The silica turbidity standard, which was first adopted by the United States Geological Survey, and later by the American Public Health Association, is to be recommended for its simplicity and the readiness with which it may be prepared in any laboratory. Its preparation is described in every edition of *Standard Methods of Water Analysis.* In our laboratory a single standard preparation is used—a suspension of 300 parts per million of silica in an 8-cc homeopathic vial. This choice of standard was made because at the given density black letters of ordinary type are barely legible through it. At this degree of legibility comparisons may be made with the greatest accuracy. Sealed with a paraffin-covered cork stopper the standard may be kept indefinitely without deterioration. The one standard serves to prepare a suspension of any desired density. For example, to prepare a bacterial suspension of a density equivalent to 600 p. p. m. of the silica standard as used for the opsono-cytophagic test, the procedure is as follows:

Into an 8-cc homeopathic vial, 0.2 cc of the dense bacterial suspension is placed, and water is added until the density matches that of the standard. If, for example, it requires 3.8 cc of saline solution to bring 0.2 cc of the heavy bacterial suspension to the density of the 300 p. p. m. standard, then 3.6 cc of saline solution is added to 0.4 cc of the heavy bacterial suspension to bring it to a density equivalent to 600 p. p. m. of the silica standard. A *Brucella* suspension of this density contains approximately 5 billion organisms per cubic centimeter.

Preparation of the smears.—At the beginning of the investigations the slides received from the field sometimes had smears so thin that it was impossible to find enough leucocytes to make a satisfactory reading. In response to a request that smears of sufficient thickness for reading be spread over a larger area of the slide, the described technique for preparing the slides was devised by Dr. Royall M. Calder, who conducted the investigation in San Antonio, Texas. On some of the slides areas were found in which the smear was too thick, with the leucocytes in clumps. If the slide was properly prepared, however, areas with isolated leucocytes suitable for reading could readily be found.

Staining the slides.—The Hasting's stain, which is recommended by Huddleson, was found to be less satisfactory than Bordet-Gengou's carbol toluidin blue, which we had found most satisfactory in phagocytic studies made many years ago.

Reading the slides and interpreting results.—For the reading of slides and the interpretation of results we devised a method more simple than Huddleson's.

The wearisome task of counting bacteria ingested by leucocytes was omitted without loss of accuracy in interpretation. Indeed, the counting of ingested bacteria may be a source of error when the numbers are few, because it is not the number of bacteria that appear to be within the leucocyte which determines whether the reaction of the given cell is positive or negative. The significant point to be determined is whether the bacteria which appear to be within the leucocyte are more numerous than in an equivalent area of the surrounding field.

If two samples of blood are tested with bacterial suspensions of exactly the same density, and smears are prepared of exactly the same thickness, the number of bacteria in a field the size of a leucocyte may differ greatly on the two slides, depending on whether or not agglutination takes place. Negative chemotaxis does not occur. Hence, on one slide there may be an even distribution of bacteria, with some lying over the leucocytes and appearing to be ingested. On the other slide the bacteria may be agglutinated, with most of the inactive leucocytes standing in a clear field. Thus, if the presence of bacteria apparently within a leucocyte is regarded as signifying a positive reaction, many of the cells of the first slide may be erroneously recorded as positive, whereas that error would not be so likely to be made on the second slide. For this reason a rapid decision, made at a glance which takes in the surrounding field as well as the leucocyte, may result in more accurate judgment than the arduous counting of cells.

Twenty-five isolated polymorphonuclear leucocytes were examined, chosen from at least two separated areas. Leucocytes with no more bacteria than in a corresponding area of the surrounding field were recorded as negative. Those with more bacteria than in the surrounding field were recorded as positive; and if the leucocyte was filled with bacteria a circle was drawn around the plus sign. A leucocyte was regarded as "filled" if it contained approximately 40 bacteria or more. The following reading of a slide offers an illustration. Percentages are obtained by multiplying the number of negative, positive, or filled cells by four:

$$\begin{array}{ccccc} \oplus & + & - & \oplus & - \\ - & \oplus & \oplus & + & \oplus \\ \oplus & \oplus & \oplus & + & \oplus \\ \oplus & + & \oplus & + & - \\ - & - & - & + & \oplus \end{array}$$

-28 percent; $+72$ percent, of which 48 percent are filled ($\oplus$)

The interpretation of the readings was made according to the accompanying chart.

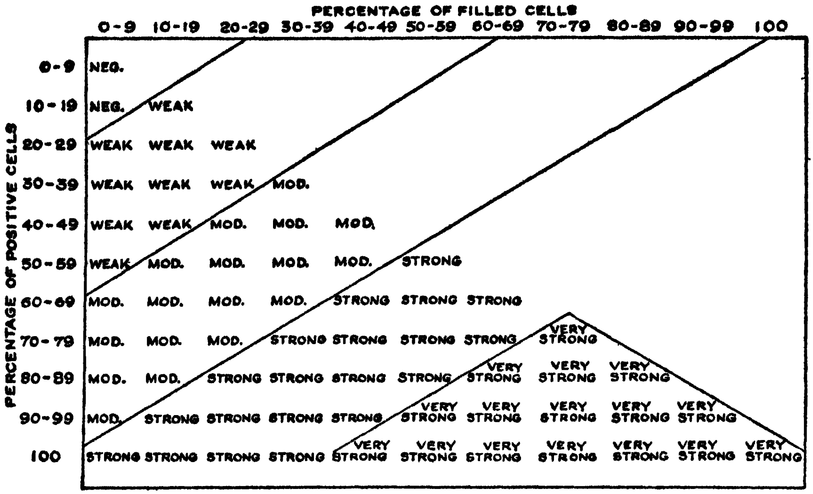


CHART 1.—The interpretation of opsono-cytophagic reactions.

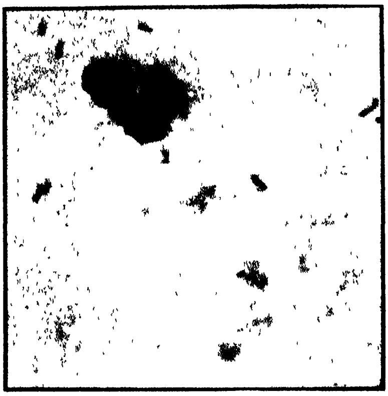
According to this system of interpretation, the total percentage of reacting leucocytes receives a rating on the vertical scale, and the rating is increased on the horizontal scale, according to the percentage of filled cells. There are 5 degrees in the rating of a reaction—negative, weak, moderate, strong, and very strong. Thus, a reading of 72 percent positive cells with 24 percent of them filled would be interpreted as a moderately positive reaction; with 48 percent of cells filled the reaction would be interpreted as strong; with all of the reacting leucocytes filled the reaction would be interpreted as very strong. Photographs of leucocytes which would be read as negative, positive, or "filled" are shown on plate I.

In a general way, our system of readings may be compared with Huddleson's as follows: We would record with a plus sign leucocytes which he would record as slightly or moderately positive. We would record with an encircled plus sign the leucocytes which he would record as markedly positive.

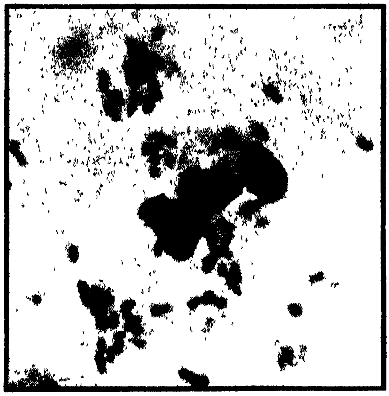
In the consideration of only 25 leucocytes on a slide we follow Huddleson's practice. We believe that other inaccuracies inherent in the technique would obviate further refinement of the readings by the examination of a larger number of cells.

In spite of the various sources of error with which the investigator must contend in preparing and reading the slides, the final result leading to an interpretation of negative, weak, moderate, strong, or very strong phagocytosis may be obtained in repeated tests with considerable accuracy.

PLATE I



Negative

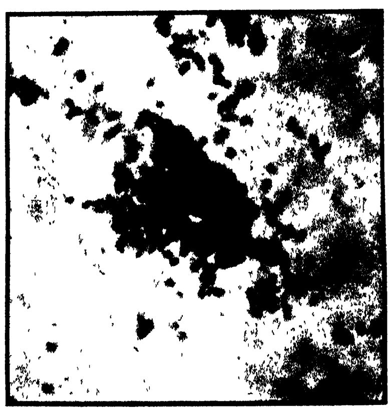


Negative

Positive

Positive

Filled



Filled

One of our field workers submitted from several cases repeated smears with different numbers. In some of these cases the reaction was positive, in some it was negative. The results were always consistently positive or negative, though the degree of a positive reaction sometimes varied, as, for example, from a weak to a moderate reaction.

Further evidence of the consistency of results in the opsonocytophagic test was obtained by repeating the test on four different occasions on a volunteer who had an acute attack of brucellosis in 1923. The reactions were as follows:

October 28, 1936, strong.
January 7, 1937, strong.
February 27, 1937, moderate.
July 10, 1937, moderate.

The discrepancy in the readings might have been due either to a change in the immunity status of the subject or to experimental error.

When the test is carried out with normal serum a few leucocytes often appear to have engulfed bacteria. Hence, it would be erroneous to interpret such a test as positive. The line of division between a reading regarded as negative or weakly positive as given on the chart is necessarily arbitrary, as is the line of division between the higher degrees of phagocytosis.

The writer tested the accuracy of her own readings by reexamining 100 slides received from the field investigators. The slides to be reread were first chosen from the records of the previous readings. They were taken in consecutive order, excepting that several series of slides with negative readings were omitted, so that a goodly percentage of positive readings would be included in the 100 slides.

Readings were then made without knowing the previous rating. On 82 percent of the slides the second reading agreed with the first. On 15 percent of the slides there was one degree of error, as, for example, a slide was interpreted as weakly positive in one reading and moderately positive in the other. A third reading confirmed either the one or the other previous reading. On 3 percent of the slides, all of which were unsatisfactory, there was greater error.

From the above results it may be concluded that good slides may be read with considerable accuracy; and that it is useless to attempt to make readings on unsatisfactory slides.

Foshay and LeBlanc have recently published a nomogram for the conversion of inclusion counts into phagocytic index numbers. It came to the writer's attention after the chart for the interpretation of phagocytic readings had been in use for some time.

Dr. Foshay generously responded to the suggestion that the two systems should be correlated. Accordingly, he determined the phagocytic index number on 100 slides prepared by our field investigators which had been previously read and interpreted by the writer. The

slides were selected to include approximately equal numbers with readings of negative, weak, moderate, strong, and very strong reactions. The results give the following correlation between the two systems of interpretation:

Evans' interpretation	Foshay's phagocytic index number
Negative	1-20
Weak	21-30
Moderate	31-60
Strong	61-80
Very strong	81-100

THE INTRADERMAL TEST

Huddleson's *Brucella* nucleo-protein solution, designated "brucellergin", prepared in his laboratory, was used for the allergic reaction. The technique for the preparation of this ether-washed antigen is described in *Brucella Infections in Animals and Man.* The test was made by injecting 0.1 cc of nucleo-protein solution in the lateral surface of the forearm.

Each lot of brucellergin already standardized as to total nitrogen content was standardized for potency on a hypersensitive subject (always the same subject). In the case of each of three lots tested with the 1 to 10 dilution of the material as received from Huddleson, a moderate to severe reaction resulted. In the case of each of two lots tested with the 1 to 100 dilution, a moderate reaction resulted, with an area of erythema of about 5 cm in diameter, and an indurated central area of about 1 cm in diameter.

Five volunteers with histories of having suffered with brucellosis were tested, four with a 1 to 10 and one with a 1 to 100 dilution of brucellergin. In two receiving the 1:10 dilution a general systemic reaction resembling the symptoms of brucellosis was severe enough to incapacitate the subjects for one or two days. The one receiving the 1:100 dilution suffered a slight systemic reaction.

From these results it appeared that it might be unwise to use undiluted material in a patient without having first tested him for hypersensitivity with diluted material. Each field investigator followed his own judgment as to whether he should use undiluted brucellergin in the first test. In subsequent reports the strength of brucellergin used in the several areas will be specified.

Readings were made after 24 and 48 hours in order to exclude early nonspecific reactions. The local reactions varied from weak, with an area of circumscribed erythema and slight edema of about 1.5 centimeters in diameter, to very strong, covering an area of 60 or more square centimeters. In hypersensitive subjects the area tended to lengthen, following the lymphatics, and axial glands were sometimes

swollen. Specific local reactions subsided slowly, leaving a darkened area one or two centimeters in diameter, which often persisted for months.

Goldstein and also Heathman found that the intradermal test with a heat-killed *Brucella* suspension stimulates the production of agglutinins in a large percentage of subjects. Goldstein reported, however, that when a fat-free antigen was used, there was no rise in agglutinin titer in the majority of cases. The following experiment shows that when Huddleson's nucleo-protein is used, it is important that the intradermal test be performed after the sample of blood for serological tests has been taken, because the reaction may stimulate the production of opsonins as well as agglutinins.

TABLE 1.—*The influence of the intradermal test on subsequent serological tests*

Subject	Serological reactions of the first sample		Intradermal reaction	Serological reactions of the second sample	
	Agglutinin titer	Opsono-cytophagic reaction		Agglutinin titer	Opsono-cytophagic reaction
L. B.	[1](1:10)	Negative	—	(1:40)	Weak
C. B.	1:20	Negative	—	1:160	Negative
E. C.	(1:20)	Moderate	+	(1:10)	Negative
L. D.	(1:10)	Negative	—	0	Negative
M. H.	0	Negative	—	0	Negative
M. J.	1:10	Negative	—	1:80	Strong
M. M.	(1:20)	Weak	++++	1:40	Weak
T. P.	0	Weak	++++	1:320	Moderate
R. R.	0	Negative	—	1:160	Negative
G. S.	(1:20)	Negative	—	1:40	Weak
S. S.	1:20	Negative	—	1:80	Moderate
W. W.	1:10	Weak	++++	(1:40)	Negative

[1] Parentheses around the titer indicates that definite agglutination did not occur, but that there was partial sedimentation in the indicated and lower dilutions.

Samples of blood were taken from 12 adult volunteers, then each one was injected with Huddleson's nucleo-protein, diluted 1 to 10. Two weeks later, samples of blood were taken again. Tests for agglutination and opsono-cytophagic reactions were carried out on both samples of blood from each subject, with results as summarized in table 1. There was a development of opsonins in 5 of the 12 subjects, and there was definite development of agglutinins in 7 of the subjects, with a rise from 0 to a titer of 1 to 320 in one case.

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Francis, Edward: Culture medium for Bacterium tularense. (This leaflet may be obtained from the National Institute of Health, Washington, D. C.)

Goldstein, Jacob D.: (1934) Cutaneous reactions in the diagnosis of undulant fever. J. Clin. Invest., 13: 209–218.

Heathman, Lucy S.: (1934) A survey of workers in packing plants for evidence of Brucella infection. J. Inf. Dis., 55: 243–265.

Huddleson, I. Forest: (1934) Brucella Infections in Animals and Man. The Commonwealth Fund, New York.

DEATHS DURING WEEK ENDED SEPTEMBER 18, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 18, 1937	Corresponding week, 1936
Data from 86 large cities in the United States:		
Total deaths	6,816	7,142
Average for 3 prior years	6,988	
Total deaths, first 37 weeks of year	323,179	323,944
Deaths under 1 year of age	483	512
Average for 3 prior years	489	
Deaths under 1 year of age, first 37 weeks of year	20,841	20,580
Data from industrial insurance companies.		
Policies in force	69,840,308	68,465,466
Number of death claims	10,349	11,391
Death claims per 1,000 policies in force, annual rate	7.7	8.7
Death claims per 1,000 policies, first 37 weeks of year, annual rate	10.0	10.1

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (------) indicate that cases or deaths may have occurred although none was reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 25, 1937, and Sept. 26, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept 25, 1937	Week ended Sept 26, 1936	Week ended Sept. 25, 1937	Week ended Sept. 26, 1936	Week ended Sept 25, 1937	Week ended Sept 26, 1936	Week ended Sept. 25, 1937	Week ended Sept 26, 1936
New England States:								
Maine	1	1	------	1	9	32	0	1
New Hampshire	------	------	------	------	1	5	0	0
Vermont	1	------	------	------	3	6	0	0
Massachusetts	2	8	------	------	11	25	1	1
Rhode Island	------	------	------	------	------	6	0	0
Connecticut	5	------	5	------	------	4	1	1
Middle Atlantic States:								
New York	13	26	[1] 11	[1] 11	43	39	2	6
New Jersey	13	5	5	5	20	16	2	0
Pennsylvania	29	28	------	------	142	30	5	3
East North Central States:								
Ohio	28	23	2	3	54	20	3	3
Indiana	13	10	12	10	6	2	1	1
Illinois	48	14	12	3	43	12	4	5
Michigan	22	13	3	------	18	10	3	1
Wisconsin	5	2	16	12	27	14	2	1
West North Central States:								
Minnesota	3	8	------	1	3	10	4	1
Iowa	3	2	1	------	1	2	0	1
Missouri	14	3	26	58	18	1	0	1
North Dakota	1	------	5	16	1	2	0	0
South Dakota	1	1	------	------	------	2	0	0
Nebraska	3	3	------	------	3	1	0	0
Kansas	3	7	1	------	14	2	1	0
South Atlantic States:								
Delaware	------	------	------	------	------	3	0	0
Maryland [3]	17	13	6	3	4	6	1	3
District of Columbia	4	14	------	------	1	4	0	0
Virginia	41	30	------	------	5	5	1	6
West Virginia	27	14	24	2	25	2	2	2
North Carolina [3]	110	81	1	5	41	4	1	1
South Carolina	21	23	135	130	2	------	1	0
Georgia [3]	30	47	------	------	------	------	0	2
Florida [3]	12	8	------	2	------	1	1	3
East South Central States:								
Kentucky	25	14	10	1	33	9	3	6
Tennessee [4]	37	43	17	11	19	2	2	1
Alabama [3]	43	48	9	3	1	------	2	2
Mississippi [2,3]	30	22	------	------	------	------	1	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 25, 1937, and Sept. 26, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Sept. 25, 1937	Week ended Sept. 26, 1936	Week ended Sept. 25, 1937	Week ended Sept. 26, 1936	Week ended Sept. 25, 1937	Week ended Sept. 26, 1936	Week ended Sept. 25, 1937	Week ended Sept. 26, 1936
West South Central States:								
Arkansas	25	4	8	8	2		0	0
Louisiana [3]	13	16	3	3	1	1	0	0
Oklahoma [5]	5	4	17	8	1		1	0
Texas [3]	46	31	99	19	42		4	0
Mountain States:								
Montana	3	2		8	3		0	1
Idaho	2			2	2		0	0
Wyoming					2	2	0	0
Colorado	7	3			7	2	1	5
New Mexico	2	1	1	1	6	20	0	0
Arizona	7	2	10	9	1	8	0	0
Utah [2, 4]	10		2		8	1	0	0
Pacific States:								
Washington	1	2	2	1	10	7	0	0
Oregon	1	1	11	13	4	2	1	2
California	33	22	17	29	27	32	6	1
Total	760	599	471	373	664	352	57	62
First 38 weeks of year	16,195	17,073	276,296	141,416	244,478	269,012	4,446	6,172

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers	
	Week ended Sept. 25, 1937	Week ended Sept. 26, 1936	Week ended Sept. 25, 1937	Week ended Sept. 26, 1936	Week ended Sept. 25, 1937	Week ended Sept. 26, 1936	Week ended Sept. 25, 1937	Week ended Sept. 26, 1936
New England States:								
Maine	6	6	5	7	0	0	1	2
New Hampshire	1	0		6	0	0	0	0
Vermont	3	0	1	4	0	0	0	0
Massachusetts	21	1	51	50	0	0	8	3
Rhode Island	2	0	5	13	0	0	0	0
Connecticut	11	3	17	10	0	0	2	1
Middle Atlantic States:								
New York	61	16	99	130	0	0	20	25
New Jersey	21	2	26	16	0	0	11	16
Pennsylvania	66	1	125	110	0	0	51	22
East North Central States:								
Ohio	28	27	111	99	0	0	27	30
Indiana	10	7	60	60	0	0	5	8
Illinois	66	75	156	107	0	5	22	29
Michigan	63	9	144	88	2	1	12	11
Wisconsin	44	4	46	76	0	0	4	2
West North Central States:								
Minnesota	53	8	32	19	3	0	8	3
Iowa	31	7	36	12	0	2	7	2
Missouri	83	2	75	12	0	0	22	17
North Dakota	1	2	5	7	6	4	2	2
South Dakota	6	1	6	6	0	0	2	2
Nebraska	7	3	6	14	2	0	1	1
Kansas	36	4	64	31	0	0	7	5
South Atlantic States:								
Delaware	1	0			0	0	1	1
Maryland [3]	9	5	19	12	0	0	18	16
District of Columbia	6	1	7	4	0	0	0	2
Virginia	4	3	21	15	0	0	22	26
West Virginia	3	4	47	30	0	0	10	24
North Carolina [3]	1	1	54	45	0	0	18	30
South Carolina	0	0	9	8	0	0	14	20
Georgia	1	11	34	15	0	0	15	21
Florida [3]	2	0	3	2	0	0	4	5

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Sept. 25, 1937, and Sept. 26, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers	
	Week ended Sept. 25, 1937	Week ended Sept. 26, 1936	Week ended Sept. 25, 1937	Week ended Sept. 26, 1936	Week ended Sept. 25, 1937	Week ended Sept. 26, 1936	Week ended Sept. 25, 1937	Week ended Sept. 26, 1936
East South Central States:								
Kentucky	5	1	58	27	0	1	38	26
Tennessee [4]	1	23	33	27	0	0	14	35
Alabama [3]	1	6	17	13	0	0	7	32
Mississippi [2, 3]	9	8	7	15	0	0	6	17
West South Central States:								
Arkansas	12	1	9	6	0	0	22	10
Louisiana [3]	5	1	10	1	0	0	26	23
Oklahoma [5]	13	0	15	10	1	0	12	12
Texas [3]	17	2	23	15	0	0	64	24
Mountain States:								
Montana	4	1	27	29	5	4	1	10
Idaho	2	0	12	9	1	0	0	4
Wyoming	8	0	9	4	0	0	0	1
Colorado	9	9	10	15	0	0	27	10
New Mexico	1	4	2	6	0	0	15	23
Arizona	0	0	4	5	0	0	2	0
Utah [2, 4]	2	0	81	7	0	0	1	0
Pacific States:								
Washington	6	5	16	19	25	3	6	4
Oregon	3	5	7	15	1	0	2	2
California	35	18	67	93	3	0	21	13
Total	730	277	1,671	1,324	49	20	578	572
First 38 weeks of year	7,121	2,538	170,459	183,975	8,233	6,090	11,192	10,342

[1] New York City only
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Sept. 25, 1937, 60 cases, as follows: North Carolina, 1; Georgia, 24; Florida, 7; Alabama, 14; Mississippi, 1; Louisiana, 3, Texas, 10.
[4] Rocky Mountain spotted fever, week ended Sept. 25, 1937, 3 cases, as follows. Tennessee, 1; Utah, 2
[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
August 1937										
Florida	2	23	4	169	26	1	3	7	0	5
Kansas	4	10	2	10	20	-------	56	91	-------	30
Louisiana	4	48	37	132	4	7	25	26	0	81
Maine	-------	-------	-------	-------	10	-------	35	11	0	12
Maryland	7	16	3	3	31	1	29	31	0	56
Massachusetts	11	17	-------	6	107	-------	147	112	0	12
Mississippi	2	50	642	7,951	217	289	39	19	0	47
Montana	1	7	1	-------	30	-------	11	49	57	17
New Mexico	2	15	-------	6	91	3	4	9	0	39
New York	27	55	-------	16	525	-------	160	323	11	92
North Dakota	1	12	6	-------	2	-------	0	23	12	6
Oklahoma	11	18	42	312	19	18	104	30	0	111
Rhode Island	1	1	-------	-------	7	-------	4	16	0	3
South Dakota	4	1	3	-------	3	-------	6	32	7	-------
Texas	15	99	174	2,525	162	177	182	110	0	337

Summary of monthly reports from States—Continued

August 1937

Disease and State	Cases
Anthrax:	
Louisiana	1
Mississippi	2
North Dakota	1
South Dakota	1
Texas	1
Chicken pox:	
Florida	5
Kansas	8
Louisiana	1
Maine	23
Maryland	12
Massachusetts	105
Mississippi	147
Montana	39
New Mexico	6
New York	257
North Dakota	8
Oklahoma	7
Rhode Island	5
South Dakota	12
Texas	40
Conjunctivitis:	
New Mexico	9
Oklahoma	1
Dengue:	
Florida	1
Mississippi	2
Texas	9
Diarrhea:	
Maryland	81
Dysentery:	
Kansas (amoebic)	1
Kansas (bacillary)	8
Louisiana (amoebic)	7
Louisiana (bacillary)	2
Maryland (bacillary)	80
Massachusetts (bacillary)	20
Mississippi (amoebic)	126
Mississippi (bacillary)	820
New Mexico (amoebic)	2
New Mexico (bacillary)	9
New Mexico (unspecified)	10
New York (amoebic)	8
New York (bacillary)	114
Oklahoma	18
Texas (amoebic)	5
Texas (bacillary)	263
Encephalitis, epidemic or lethargic:	
Kansas	8
Louisiana	4
Maryland	1
Massachusetts	2
Montana	1
New York	3
North Dakota	1
Oklahoma	5
South Dakota	4
Texas	4
Food poisoning:	
New Mexico	1
German measles:	
Kansas	5
Maine	3
Maryland	1
Massachusetts	26
Montana	6
New York	87
Rhode Island	3
Hookworm disease:	
Florida	599
Louisiana	89
Mississippi	804
Impetigo contagiosa:	
Kansas	5
Maryland	24
Montana	2
Lead poisoning:	
Massachusetts	1
Leprosy:	
Louisiana	2
Mumps:	
Florida	29
Kansas	69
Louisiana	1
Maine	45
Maryland	15
Massachusetts	95
Mississippi	149
Montana	49
New Mexico	4
Oklahoma	3
Rhode Island	4
South Dakota	8
Texas	106
Ophthalmia neonatorum:	
Florida	1
Louisiana	2
Maryland	1
Massachusetts	83
Mississippi	6
New Mexico	1
New York [1]	7
Paratyphoid fever:	
Florida	1
Kansas	1
Maine	1
Maryland	2
Massachusetts	34
Montana	3
New Mexico	1
New York	18
Texas	26
Psittacosis:	
New York (delayed report)	3
Puerperal septicemia:	
Mississippi	39
New Mexico	5
Rabies in animals:	
Louisiana	14
Massachusetts	13
Mississippi	13
New York [1]	9
Rabies in man:	
Florida	1
Louisiana	1
Mississippi	2
Rocky Mountain spotted fever:	
Maryland	5
Montana	3
New York	1
Rhode Island (imported)	2
Septic sore throat:	
Kansas	2
Louisiana	9
Maine	3
Maryland	4
Massachusetts	7
Montana	10
New Mexico	1
New York	30
Oklahoma	34
Rhode Island	2
South Dakota	5
Tetanus:	
Louisiana	4
Maine	1
New York	7
Oklahoma	1
Trachoma:	
Massachusetts	3
Mississippi	10
Montana (delayed report)	93
New Mexico	2
Oklahoma	8
Trichinosis:	
Massachusetts	3
New York	2
Tularaemia:	
Florida	1
Louisiana	2
New Mexico	1
Texas	2
Typhus fever:	
Florida	12
Louisiana	6
Mississippi	4
New York	1
Texas	64
Undulant fever:	
Florida	4
Kansas	8
Louisiana	5
Maine	1
Maryland	6
Massachusetts	3
Mississippi	3
Montana	1
New Mexico	4
New York	18
Oklahoma	24
Rhode Island	2
South Dakota	1
Texas	7
Vincent's infection:	
Florida	31
Kansas	16
Maryland	15
New York [1]	68
Oklahoma	7
Whooping cough:	
Florida	23
Kansas	282
Louisiana	63
Maine	93
Maryland	418
Massachusetts	682
Mississippi	509
Montana	185
New Mexico	93
New York	1,610
North Dakota	180
Oklahoma	52
Rhode Island	112
South Dakota	53
Texas	628

[1] Exclusive of New York City.

PLAGUE INFECTION IN CALIFORNIA

Dr. W. M. Dickie, director of public health of California, under date of September 22, 1937, states that plague infection has been demonstrated in pools of fleas taken from rodents and in tissue specimens from rodents in California as follows:

San Bernardino County.—160 fleas from 20 golden mantled squirrels, 80 fleas from 18 *fisheri* squirrels, 70 fleas from 13 *fisheri* squirrels, 56 fleas from 27 golden mantled squirrels, collected on August 12; 98 fleas from 21 *fisheri* squirrels collected August 20; 140 fleas from 11 *fisheri* squirrels, 30 fleas from 36 golden mantled squirrels collected August 23; 253 fleas from 11 *fisheri* squirrels collected August 27; 213 fleas from 33 *fisheri* squirrels collected September 8.

San Mateo County.—16 fleas from 1 *beecheyi* squirrel and 46 fleas from 1 *beecheyi* squirrel collected September 22, 1936.

El Dorado County, Lake Tahoe region.—16 fleas from 27 golden mantled squirrels collected August 31.

Fresno County.—Specimens of tissue from 3 *beecheyi* squirrels received at the laboratory September 16 were proved positive for plague, by animal inoculation, on September 20.

WEEKLY REPORTS FROM CITIES

City reports for week ended Sept. 18, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	160	76	16	107	304	377	4	346	96	908	--------
Current week [1]	83	38	12	162	263	330	2	325	84	1, 044	--------
Maine:											
Portland	0	------	0	0	0	0	0	0	0	14	29
New Hampshire:											
Concord	0	------	0	0	0	0	0	0	0	0	1
Manchester	0	------	0	0	1	0	0	0	0	0	14
Nashua	0	------	0	0	0	0	0	1	0	0	9
Vermont:											
Barre	0	------	0	1	0	0	0	0	0	0	2
Burlington	0	------	0	0	0	0	0	0	2	2	6
Rutland	0	------	0	0	0	0	0	0	0	0	1
Massachusetts:											
Boston	0	------	0	3	8	14	0	2	0	23	182
Fall River	0	------	0	0	2	1	0	0	0	23	20
Springfield	0	------	0	0	0	1	0	1	1	4	32
Worcester	0	------	0	1	2	3	0	1	0	3	36
Rhode Island:											
Providence	0	------	0	2	2	3	0	3	0	33	53
Connecticut:											
Bridgeport	0	1	1	0	0	0	0	0	0	0	25
Hartford	0	------	0	0	2	5	0	0	2	1	23
New Haven	0	------	0	2	1	2	0	0	0	2	34
New York:											
Buffalo	0	------	0	1	3	3	0	11	1	9	121
New York	11	6	1	8	45	25	0	75	20	127	1, 117
Rochester	0	------	1	1	1	1	0	0	2	6	46
Syracuse	0	------	0	7	1	1	0	2	0	25	46
New Jersey:											
Camden	5	------	0	0	1	0	0	0	0	0	25
Newark	0	------	0	2	2	2	0	5	0	14	70
Trenton	0	------	0	3	0	1	0	3	1	7	14
Pennsylvania:											
Philadelphia	8	------	0	2	14	12	0	18	8	24	293
Pittsburgh	1	------	8	31	10	12	0	8	3	24	118
Reading	0	------	0	0	1	0	0	0	0	0	9
Scranton	2	------	--------	0	-------	1	0	-------	0	5	--------

[1] Figures for Columbus and Boise estimated; reports not received.

City reports for week ended Sept. 18, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Ohio:											
Cincinnati	0	1	0	0	2	4	0	10	1	20	113
Cleveland	3	4	0	6	4	14	0	10	4	35	159
Toledo	0	------	0	3	2	4	0	4	2	17	49
Indiana:											
Anderson	0	------	0	1	1	4	0	0	0	5	12
Fort Wayne	0	------	0	0	1	1	0	0	0	0	24
Indianapolis	0	------	0	1	5	5	0	3	0	17	78
South Bend	0	------	0	0	1	0	0	0	0	1	10
Terre Haute	1	------	0	0	0	3	0	0	1	0	16
Illinois:											
Alton	0	------	0	0	0	1	0	0	0	0	8
Chicago	5	2	2	19	19	41	0	34	2	62	536
Elgin	0	------	0	0	0	0	0	0	0	0	3
Moline	0	------	0	0	0	3	0	0	0	2	5
Springfield	0	------	0	0	1	1	0	0	0	4	18
Michigan											
Detroit	5	3	0	13	9	30	0	23	2	84	246
Flint	0	------	0	0	1	5	0	0	1	2	20
Grand Rapids	0	------	0	0	1	2	0	1	1	13	25
Wisconsin:											
Kenosha	0	------	0	0	1	2	0	0	0	2	11
Madison	1	------	0	0	0	1	0	0	0	19	19
Milwaukee	0	1	1	16	1	3	0	2	0	44	74
Racine	0	------	0	1	0	2	0	0	0	2	9
Superior	0	------	0	0	0	0	0	0	0	0	8
Minnesota:											
Duluth	0	------	0	0	1	2	0	0	0	5	13
Minneapolis	0	------	0	2	5	6	0	1	1	18	72
St. Paul	0	------	0	2	1	3	1	1	0	17	54
Iowa:											
Cedar Rapids	0	------	------	0	------	0	0	------	0	0	------
Des Moines	0	------	0	0	0	5	0	0	0	3	20
Sioux City	0	------	------	0	------	1	0	------	0	2	------
Waterloo	1	------	------	0	------	3	0	------	0	0	------
Missouri:											
Kansas City	1	------	0	2	3	2	0	0	2	2	79
St. Joseph	0	------	0	0	2	1	0	0	0	0	23
St. Louis	4	------	1	9	6	19	0	6	1	15	222
North Dakota:											
Fargo	1	------	0	0	1	1	0	0	0	28	6
Grand Forks	0	------	------	0	------	0	0	------	0	5	------
Minot	0	------	0	0	0	0	0	0	0	3	4
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	4	------
Sioux Falls	0	------	0	0	0	0	0	0	0	0	9
Nebraska:											
Omaha	0	------	0	0	2	1	0	3	0	0	46
Kansas:											
Lawrence	0	------	0	0	0	0	0	0	0	4	2
Topeka	0	------	0	0	1	0	0	0	1	7	8
Wichita	0	------	0	0	4	0	0	0	0	4	24
Delaware:											
Wilmington	0	------	0	0	1	1	0	1	0	0	18
Maryland:											
Baltimore	2	3	0	2	10	6	0	10	2	57	197
Cumberland	0	------	0	0	0	2	0	0	0	1	18
Frederick	0	------	0	0	0	0	0	0	0	0	3
Dist. of Columbia:											
Washington	2	------	0	0	6	5	0	9	1	2	140
Virginia:											
Lynchburg	5	------	0	0	1	0	0	0	0	1	12
Norfolk	0	------	0	0	4	0	0	1	0	0	30
Richmond	0	------	0	0	3	3	0	1	1	5	49
Roanoke	2	------	0	0	0	0	0	0	0	11	15
West Virginia:											
Charleston	0	------	0	0	1	3	0	0	0	0	15
Huntington	1	------	0	0	------	0	0	------	0	0	------
Wheeling	0	------	0	0	2	0	0	0	0	8	23
North Carolina:											
Gastonia	0	------	------	0	------	1	0	------	0	5	------
Raleigh	0	------	0	0	1	0	0	2	0	7	9
Wilmington	0	------	0	0	0	0	0	0	0	1	8
Winston-Salem	0	------	0	0	0	1	0	0	0	2	16
South Carolina:											
Charleston	0	1	0	0	2	1	0	2	3	0	22
Columbia	0	------	0	0	0	0	0	0	0	0	5
Greenville	0	------	0	0	1	0	0	0	0	1	22

City reports for week ended Sept. 18, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Georgia:											
Atlanta	2	------	0	0	3	4	0	4	1	11	64
Brunswick	0	------	0	0	0	0	0	0	0	2	5
Savannah	1	3	0	0	2	0	0	4	0	0	34
Florida											
Miami	3	------	0	2	2	0	0	5	0	0	28
Tampa	0	1	1	2	0	0	0	0	0	0	16
Kentucky:											
Ashland	0	------	0	0	0	0	0	2	0	0	16
Covington	1	------	0	0	0	0	0	1	0	9	6
Lexington	0	------	0	0	1	1	0	2	0	5	21
Louisville	1	------	0	2	2	11	0	3	0	26	44
Tennessee											
Knoxville	4	1	0	0	1	0	0	0	1	0	18
Memphis	2	------	0	0	2	1	0	0	3	13	75
Nashville	0	------	0	0	0	2	0	0	1	13	32
Alabama											
Birmingham	1	1	0	2	3	3	0	5	0	4	60
Mobile	1	------	0	0	0	0	0	1	0	0	19
Montgomery	1	------	--------	0	-------	1	0	-------	0	0	--------
Arkansas:											
Fort Smith	0	------	--------	0	-------	1	0	-------	0	5	--------
Little Rock	1	------	0	0	5	0	0	1	0	0	6
Louisiana											
Lake Charles	0	------	--------	0	-------	0	0	-------	0	0	--------
New Orleans	2	1	0	0	9	3	0	9	1	5	120
Shreveport	0	------	0	0	4	5	0	2	0	0	36
Oklahoma											
Muskogee	0	------	0	0	0	0	0	0	0	0	--------
Oklahoma City	0	------	0	0	2	4	0	1	1	0	38
Tulsa	1	------	--------	0	-------	0	0	-------	0	3	--------
Texas											
Dallas	3	------	0	0	2	1	0	2	5	8	51
Fort Worth	4	------	0	0	2	2	0	0	0	8	39
Galveston	0	------	0	0	0	0	0	0	0	0	11
Houston	7	------	0	3	6	1	0	3	2	9	74
San Antonio	1	------	0	0	3	0	0	6	1	2	48
Montana											
Billings	0	------	0	0	0	1	0	0	0	0	14
Great Falls	0	------	0	0	0	1	0	0	0	5	5
Helena	0	------	0	0	0	0	0	0	0	3	6
Missoula	0	------	0	0	1	1	0	2	0	0	11
Idaho											
Boise	------	------	--------	------	-------	-------	------	-------	------	-------	--------
Colorado											
Colorado Springs	0	------	0	0	0	0	0	0	0	1	10
Denver	5	------	0	6	3	7	1	3	3	12	76
Pueblo	0	------	0	0	0	0	0	0	0	0	9
Utah:											
Salt Lake City	1	------	0	0	2	9	0	0	0	4	27
Washington:											
Seattle	0	------	0	3	3	1	0	2	2	28	91
Spokane	0	------	0	3	1	5	0	1	0	4	30
Tacoma	0	------	0	0	1	1	0	0	0	5	26
Oregon											
Portland	2	------	0	2	1	4	1	3	0	0	68
Salem	0	------	--------	0	-------	0	0	-------	0	0	--------
California:											
Los Angeles	4	6	0	3	11	16	0	16	2	47	363
Sacramento	0	------	0	1	0	2	0	3	0	7	15
San Francisco	0	1	0	1	5	6	0	12	0	42	193

City reports for week ended Sept. 18, 1937—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases	State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths			Cases	Deaths	
Maine:				Missouri:			
Portland	0	0	2	Kansas City	0	0	13
Massachusetts:				St. Louis	0	0	6
Boston	0	0	24	Nebraska:			
Springfield	0	0	2	Omaha	0	0	13
Worcester	0	0	2	Kansas:			
Rhode Island:				Topeka	0	0	1
Providence	0	0	3	Wichita	0	0	2
Connecticut:				Delaware:			
Bridgeport	0	0	1	Wilmington	0	0	2
Hartford	0	0	2	Maryland:			
New Haven	0	0	1	Baltimore	0	0	1
New York:				District of Columbia:			
Buffalo	1	0	7	Washington	0	0	2
New York	3	1	33	Virginia:			
Rochester	0	0	1	Norfolk	1	0	0
Syracuse	0	0	5	Richmond	1	1	0
New Jersey:				Georgia:			
Camden	0	0	3	Brunswick	0	0	3
Newark	1	0	0	Florida:			
Pennsylvania:				Miami	0	0	1
Philadelphia	2	0	14	Tampa	1	0	0
Reading	0	0	1	Kentucky:			
Ohio:				Ashland	1	0	0
Cincinnati	0	0	4	Alabama:			
Cleveland	0	0	11	Birmingham	1	1	0
Toledo	0	0	2	Arkansas:			
Indiana:				Little Rock	0	0	1
Indianapolis	0	0	3	Louisiana:			
South Bend	0	0	1	New Orleans	2	0	1
Terre Haute	0	0	1	Shreveport	0	1	0
Illinois:				Oklahoma:			
Alton	1	1	0	Tulsa	0	0	3
Chicago	0	0	36	Texas:			
Elgin	0	0	1	Dallas	0	0	4
Springfield	0	0	3	Houston	0	0	5
Michigan:				Colorado:			
Detroit	0	0	24	Colorado Springs	0	0	1
Flint	0	0	1	Pueblo	0	0	4
Wisconsin:				Utah:			
Madison	0	0	3	Salt Lake City	0	0	4
Milwaukee	0	0	14	Washington:			
Racine	1	0	2	Seattle	0	0	4
Minnesota:				Oregon:			
Duluth	0	0	2	Portland	0	0	1
Minneapolis	0	0	16	California:			
St. Paul	0	0	23	Los Angeles	0	0	7
Iowa:				Sacramento	0	0	4
Des Moines	0	0	4	San Francisco	0	0	2
Sioux City	0	0	1				

Encephalitis, epidemic or lethargic.—Cases: New York, 6; Cleveland, 2; Alton, 1; St. Louis, 76; Great Falls, 1; Los Angeles, 1; Sacramento, 2; San Francisco, 1.

Pellagra.—Cases: Lynchburg, 8; Atlanta, 1; Savannah, 1; Birmingham, 2; New Orleans, 1; Dallas, 1; San Francisco, 1.

Typhus fever.—Cases: Atlanta, 1; Savannah, 2; New Orleans, 1; Dallas, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended September 11, 1937.—During the 2 weeks ended September 11, 1937, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis			1		6	1			1	9
Chicken pox				42	51	8	20	15	36	172
Diphtheria		2	2	83	9	1	1		3	101
Dysentery				2	29					31
Erysipelas				6		4	1	4		15
Influenza	2	14		1	6					23
Lethargic encephalitis	1	1			1					3
Measles		9		66	109	6	33	32	56	311
Mumps					31	6	10	1	13	61
Paratyphoid fever					6				5	11
Pneumonia	3	1			15				3	22
Poliomyelitis		7	40	34	782	60	87	39	1	1,050
Scarlet fever		7	6	89	76	24	45	31	28	306
Trachoma						1	1		2	4
Tuberculosis	5	4	22	113	74	1	1	5	32	257
Typhoid fever			16	91	23	2	22	1	4	159
Undulant fever				4	4		2			10
Whooping cough		2		307	236	68	4	13	46	676

Vital statistics—First quarter 1937.—The Bureau of Statistics of the Dominion of Canada has published the following preliminary statistics for the first quarter of 1937. The rates are computed on an annual basis. There were 18.9 live births per 1,000 population during the first quarter of 1937 and 20.3 per 1,000 population for the same quarter of 1936. The death rate was 11.5 per 1,000 population for the first quarter of 1937 and 10.4 per 1,000 population for the first quarter of 1936. The infant mortality rate for the first quarter of 1937 was 87 per 1,000 live births and 69 per 1,000 live births in the corresponding quarter of 1936. The maternal death rate was 5.4 per 1,000 live births for the first quarter of 1937 and 6.2 per 1,000 live births for the same quarter of 1936.

The accompanying tables give the numbers of births, deaths, and marriages by Provinces for the first quarter of 1937, and deaths from certain causes in Canada for the first quarter of 1937 and the corresponding quarter of 1936.

Number of births, deaths, and marriages, first quarter 1937

Province	Live births	Deaths (exclusive of stillbirths)	Deaths under 1 year of age	Maternal deaths	Marriages
Canada [1]	51,623	31,534	4,482	277	12,617
Prince Edward Island	449	283	33	4	93
Nova Scotia	2,469	1,539	231	4	686
New Brunswick	2,582	1,396	272	8	504
Quebec	17,677	9,353	1,848	89	3,024
Ontario	14,924	10,887	1,003	84	4,579
Manitoba	3,178	1,822	274	11	856
Saskatchewan	4,274	1,986	334	29	883
Alberta	3,504	1,794	290	27	1,000
British Columbia	2,566	2,474	197	21	992

Cause of death	Canada [1] (first quarter)		Province, first quarter 1937								
	1936	1937	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia
Automobile accidents	147	223	1	17	9	44	120	4	3	4	21
Cancer	2,938	2,887	39	160	98	746	1,066	190	188	154	246
Diarrhea and enteritis	454	388	1	10	8	249	60	20	13	18	9
Diphtheria	65	76		5	1	53	7	6	3	1	
Diseases of the arteries	2,458	2,659	21	119	114	547	1,296	155	115	114	178
Diseases of the heart	4,452	4,617	30	201	164	1,057	1,999	267	245	217	407
Homicides	45	37	1	2	1	10	13	3	2	1	4
Influenza	1,363	3,300	19	121	95	910	1,088	220	268	306	273
Measles	135	290		1	4	71	11	3	101	42	57
Nephritis	1,747	1,813	20	84	56	790	562	51	80	71	99
Pneumonia	2,376	2,796	34	136	156	803	948	190	174	168	187
Poliomyelitis	13	8		1		3	2	1	1		
Puerperal causes	277	345	4	4	8	89	84	11	29	27	21
Scarlet fever	82	83		3	1	38	18	4	4	11	4
Smallpox	2	1								1	
Suicides	229	220	2	7	3	29	98	17	17	22	25
Tuberculosis	1,724	1,719	15	102	95	712	356	124	71	79	165
Typhoid fever and paratyphoid fever	60	43		2	1	29	6	1	1	2	1
Whooping cough	174	192	1	16	3	90	34	3	21	18	6
Violent deaths	907	935	5	59	32	183	376	35	64	63	118

[1] Exclusive of Yukon and the Northwest Territories.

GREAT BRITAIN

England and Wales—Infectious diseases—13 weeks ended July 3, 1937.—During the 13 weeks ended July 3, 1937, certain infectious diseases were reported in England and Wales as follows:

Disease	Cases	Disease	Cases
Diphtheria	12,347	Puerperal pyrexia	1,570
Ophthalmia neonatorum	1,376	Scarlet fever	20,817
Pneumonia	10,591	Typhoid fever	342
Puerperal fever	490		

England and Wales—Vital statistics—Second quarter 1937.—During the quarter ended June 30, 1937, 163,867 live births and 118,524 deaths were registered in England and Wales. The following statistics are taken from the Quarterly Return of Births, Deaths, and Marriages, issued by the Registrar General of England and Wales, and are provisional:

Birth and death rates in England and Wales, quarter ended June 30, 1937

Annual rates per 1,000 population:	
Live births	16.1
Stillbirths	.65
Deaths, all causes	11.6
Deaths under 1 year of age[1]	54
Deaths from:	
Diarrhea and enteritis (under 2 years of age)	[1] 5.2
Diphtheria	.06
Influenza	0.12
Measles	.03
Scarlet fever	.01
Typhoid fever and paratyphoid fever	0.0
Violence	.54
Whooping cough	.04

[1] Per 1,000 live births.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for September 24, 1937, pages 1351-1368. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued October 29, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

China—Hong Kong.—During the week ended September 18, 1937, 106 cases of cholera with 66 deaths were reported in Hong Kong, China.

Japan—Hiroshima.—During the week ended September 25, 1937, 32 cases of cholera with several deaths were reported in Hiroshima, Japan.

Plague

United States—California.—A report of plague infection in California appears on pages 1432-33 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

Mexico.—During the month of July 1937, smallpox was reported in Mexico as follows: Mexico, D. F., 18 cases, 3 deaths; Monterrey, Nuevo Leon State, 1 case, 1 death; Merida, Yucatan State, 1 case.

Typhus Fever

Egypt—Cairo.—During the week ended September 18, 1937, 1 case of typhus fever was reported in Cairo, Egypt.

Mexico.—During the month of July 1937, typhus fever was reported in Mexico as follows: Guadalajara, Jalisco State, 1 case; Guanajuato, Guanajuato State, 3 cases; Mexico, D. F., 16 cases, 5 deaths; Pachuca, Hidalgo State, 1 death; Toluca, Mexico State, 14 cases.

Yellow Fever

French Equatorial Africa—Ubangi Chari Territory—Bangui.—During the week ended September 18, 1937, 1 death from yellow fever was reported in Bangui, Ubangi Chari Territory, French Equatorial Africa.

Ivory Coast—Touba.—During the week ended September 25, 1937, 1 death from suspected yellow fever was reported in Touba, Ivory Coast.

x

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 39; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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DERMATITIS AMONG A GROUP OF OFFICE WORKERS FOUND NOT TO BE OF OCCUPATIONAL ORIGIN

By Louis Schwartz, *Medical Director, United States Public Health Service*, and Marion B. Sulzberger, M. D., *New York, N. Y.*

In an office employing about 750 men and women doing clerical work, considerable unrest was caused by a rumor that cases of dermatitis were occurring among the personnel which was due to handling the carbon copies with which they worked. The rumor started because it was noticed that the boy whose work it was to distribute the carbon copies among the workers had an eruption on his hands. A number of cases of dermatitis of the hands and other parts of the body were immediately called to the attention of the first-aid nurse in attendance and to the business manager in charge of the office, and in a month's time, about 25 such cases had been reported. Some of the workers went for treatment to clinics and private physicians, and several of the cases had been diagnosed as occupational dermatitis due to carbon paper, although the physician making the diagnosis had conducted no study of the exact work performed by the patient, nor had any patch tests been made. A number of the other cases had been diagnosed as mycotic infections, and the patients believed that they had contracted the infection from handling the papers which had been handled by others affected with mycotic infections.

The workers became so alarmed that they appointed a committee to wait on the business manager to whom this committee declared themselves and fellow workers unwilling to continue work unless the boy who was suspected to have spread the infection was ordered to stay away from work until cured. They also demanded that an investigation be made as to the cause of the outbreak. The committee stated that they believed the outbreak of dermatitis was due to the spread of the infection by means of the papers which were being passed from one clerk to another in the course of their work, or to the carbon on the carbon copies of certain papers which they all handled, or to the dyes on the colored paper on which the carbon copies were made. As a result of this agitation, the business manager wrote the following letter to one of the authors:

This is to confirm my telephonic request of January 5, 1937, for an investigation and examination of a skin condition which exists at the present time among a number of employees in this office.

There are approximately 750 persons employed here, doing general clerical work. The greater majority of these, and I believe all those affected by this condition, handle pay-roll sheets and cards. These pay-roll sheets come to us from many offices scattered throughout the New England States and New York State. Many of those affected have been treated by their private physicians, and have all brought in certificates stating that they are suffering from one form or another of occupational skin ailment. The news of this skin condition has so spread among the employees here as to create a mental hazard, and I feel that, in order to curb this idea that an epidemic is imminent, we should have such an investigation and examination as I have requested.

Your cooperation will be greatly appreciated.

All of the workers affected in the office investigated had taken leave of absence on account of dermatitis for various lengths of time. One worker had been absent 2 weeks. Others were absent for a few days only. (Twenty-five cases of skin affections of various kinds among 750 persons does not seem to be higher than the usual rate of skin affections occurring among the general population.)

The large majority of the workers in this office are engaged in checking carbon copies of pay rolls and cards of various colored papers. Only four of the workers affected with dermatitis actually handle carbon paper of any kind. The pay-roll sheets come from hundreds of offices scattered throughout the New England States and New York State and the carbon paper used in making up these pay-roll sheets is purchased from many different sources. The pencils used in checking the figures on the pay-roll sheets consist of carbon in colored metal casings, the color on which is in the enamel and is absolutely fast, failing to "bleed" even when boiled in hot water for some time.

Dermatitis due to carbon paper is not frequently reported. The United States Monthly Labor Review of April 1929 (pp. 782 and 783) gives carbon paper as one of 34 known agents which were reported to have caused dermatitis in a group of 390 cases of industrial dermatitis that were reported by hospital clinics and workmen's compensation boards. In reviewing some 5,000 cases of industrial dermatitis reported and classified by the various States from 1932 to 1936, there were found five cases in which the probable cause of dermatitis was stated to have been carbon paper. All of these cases were in females, presumably typists. There were no data as to whether the cause was definitely established or merely assumed. In the query files of the United States Public Health Service, Office of Dermatoses Investigations, there were found two queries from physicians asking about the possibility of contracting dermatitis from carbon paper or hectograph and typewriter ribbons. We have been unable to find any cases reported where a diagnosis of dermatitis from carbon paper was definitely established by patch tests, and no cases reported as presumably due to contact with carbon copies of papers.

In observing the method of work performed by the clerks in the office under investigation, it was noted that, in checking the carbon copies of the pay-roll sheets, the hand holding the pencil rests on the sheet and the fingers of the other hand are employed in holding the edge of the card or pay-roll sheet in order to steady it. A contact dermatitis from the cards or pay-roll sheets, therefore, would presumably first manifest itself on the thenar or hypothenar eminence of the right hand and the tips of the fingers of the left hand and on the ulnar surface of the forearms as they rest on the pay-roll sheets, because these are the areas of the skin which come in direct contact with the paper. Some of the workers also handle cards which are filed in an open-top file. The left forearm and the hand rest over the tops of the series of cards which stand on edge, and in sorting them the fingers of the left hand are used. The cards are of various colors and it is possible that a person hypersensitive to the dyes on these cards may contract a dermatitis of the fingers and forearms of the left hand. However, the cases of dermatitis occurring among the workers handling these cards did not occur on that portion of the hand or forearm which came in contact with the cards.

Twenty patients actually presented themselves for examination. The presumptive clinical diagnoses in 13 of these cases were dermatophytosis and dermatophytids. In three cases the diagnoses were seborrhea or psoriasis. There was one case of sycosis of the beard, one of ichthyosis, and one was a definite case of wrist-watch dermatitis. The boy who distributed the pay-roll sheets and who was suspected by the workers to be the source of the infection had a nummular eczema (fig. 1).

It will be noted that at least six of the infected persons had conditions which in no way could be connected with their occupation. Nine of the remainder, including the suspected boy, consented to be patch tested with samples of the materials with which they came in contact during the course of their occupation. The others refused to be "guinea-pigs", as they termed it.

Pink paper, green paper, yellow paper, a piece of unused carbon paper, three different carbon copies, and pieces of developed blueprint paper were used in patch testing. The patches were allowed to remain on for 72 hours in 8 of the cases and in 1 case for 96 hours. There were no positive reactions underneath any of the patches, nor were there any delayed reactions 3 days after the patches had been removed. The dye had "bled" from the colored paper and had dyed the skin as did, of course, the violet color of the carbon paper, but there were no signs of any inflammatory reactions. Scrapings were made from the interdigital spaces of the toes and from the lesions on the hands of 13 of the workers examined and in only one of the cases was a mycelial thread found, and that was from a scraping on the

hand (fig. 2). This patient stated that she had had a similar eruption 7 years previously while she was employed as an X-ray technician in a hospital.

In order to learn whether it were possible that pathological fungi were transmitted on the paper by contact, all of the workers examined were requested to handle the same piece of unused white paper and then the pieces of this paper were cultured and examined microscopically, but no pathological fungi could be demonstrated.

As the carbon copies of the papers handled by the workers were made from about 100 different kinds of carbon paper manufactured by various manufacturers, it was impossible to patch test with all of the different kinds. It was decided, therefore, to ask the manufacturers to send us samples of all the carbon papers which they sold to the offices in which these carbon copies of pay-roll sheets were made, and to inform us of the ingredients used in each of the samples. Replies were received from 12 of the manufacturers, and it was learned that each of these manufacturers make many kinds of carbon papers which vary in composition. The simplest ones contain carnauba wax, paraffin wax, oleic acid, mineral oil, and carbon black. Some of the more complicated compositions may have, in addition to the above ingredients, beeswax, montan wax, petroleum jelly, castor oil, lard oil, stearic acid, pitch, lamp black, and synthetic dyes such as methyl violet, crystal violet, milori blue, victoria blue, negrosine, and various toners such as tungstate blue toner and tungstate purple toner.

The carbon paper used in patch testing the nine workers was of complex composition and was found to contain carnauba wax, montan wax, paraffin wax, petroleum jelly, oleic acid, stearic acid, castor oil, pitch, lamp black, carbon black, paris blue, milori blue, methyl violet base, crystal violet, and blue base; and so when no reactions were obtained on any of the workers patched with this paper, it probably indicated that they were not hypersensitive to any of the carbon copies handled in that office.

The tests and their object were explained to the workers, who, when they saw the results, were convinced that their dermatitis was not caused by the papers which they handled and their fears and agitation subsided. They were advised, however, to use clean white blotting paper on which to rest their hands when working on the carbon copies of the pay-roll sheets or on the colored cards, so as to prevent soiling their hands and forearms with the carbon which might come off the copies.

We became interested in the question as to the sensitivity of patients with skin diseases to the ingredients in carbon paper. We, therefore, patch-tested 50 patients, affected with various types of dermatitis and eczema, with 12 different kinds of carbon paper of known compositions.

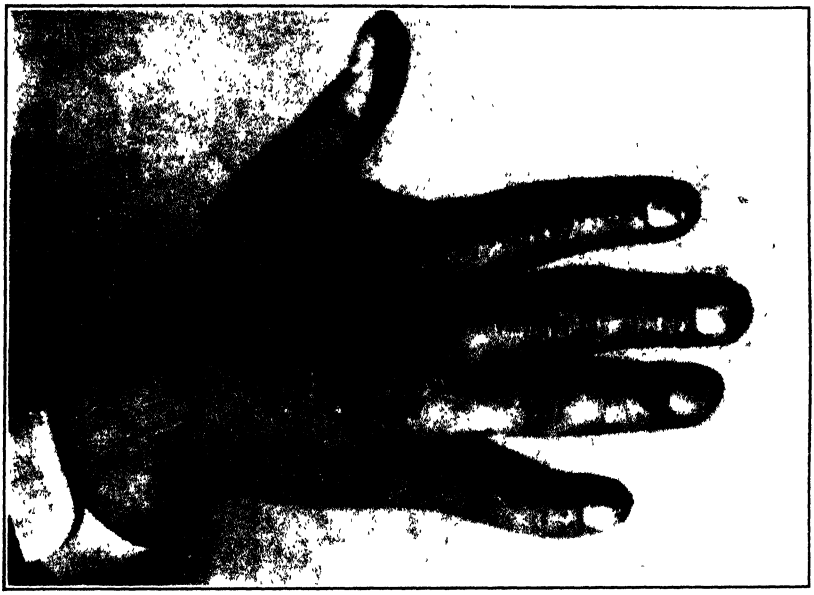

FIGURE 1.—Nummular eczema suspected by the workers to be the source of the cases of dermatitis.

FIGURE 2.—Type of dermatitis seen among the workers and thought by them to be of occupational origin but proved otherwise.

These samples of carbon paper contained combinations of all the chemicals known to be used in the manufacture of carbon paper as previously enumerated. The patients patch-tested were suffering from the following conditions, and some of the patients had a combination of two skin diseases:

Contact dermatitis	29
Seborrheic eczema and eczema	9
Dermatophytosis and dermatophytid	15
Lichen simplex	1
Total	54

We are indebted to Miss E. Malozzi, of the New York Post-Graduate Hospital, for her assistance in carrying out these patch tests.

There were no positive reactions obtained on any of the patients tested. This would indicate that hypersensitivity to carbon paper is rare even among those affected with skin diseases.

It was thought that perhaps a visit to the manufacturers of carbon paper for an examination of the workers engaged in the process of producing the paper might reveal some authentic cases of dermatitis caused by the chemicals handled. Accordingly, a study of the process of carbon-paper manufacture and an examination of the workers engaged in it were made in one factory. The following is a brief description of the process:

Paper used in the manufacture of carbon paper is purchased in rolls from the paper manufacturers and comes in different kinds—thin to thick—and of various colors. The coating of carbon on the paper is prepared in a large pot in which carnauba wax, paraffin wax, beeswax, castor oil, oleic acid, powdered dyes, and other ingredients are melted and mixed. The mass, when allowed to cool, becomes solid, and is then further mixed in a mixing mill or in special grinders, so that it becomes a homogeneous mixture. It is then taken to the machine where the actual coating of the paper is done. A roll of paper is put at one end of the machine and the paper is unrolled and is allowed to pass over a metal roller, the under surface of which dips into a hot molten mixture of the carbon coating. This puts a film of the coating on one side of the paper. The coated paper is then cooled so that the carbon film on it solidifies, and it is then rolled on to another roll. The coated paper is then inspected for flaws and cut to size.

This factory also manufactures typewriter and hectograph ribbons as well as hectograph inks. Typewriter ribbons and hectograph ribbons are made from fine cotton or silk, which is cut into proper widths and then run through an ink bath which saturates the ribbon with ink. The ribbon is then passed between two rolls to press out the excess ink. The inked ribbon is then rolled on large rolls from which it is cut to size and placed on spools for the typewriter.

Hectograph ribbons contain a greater concentration of the dyes than do ordinary typewriter ribbons.

The inks used on typewriter and hectograph ribbons contain no wax but do contain the dyes mentioned as being contained in carbon paper, and these inks may also contain red dyes, such as red barium lake, magenta, and rhodamine B base. Other dyes may be used to produce different colored hectograph inks. Mixtures of alcohol, glycerine, acetic acid, gum, and castor and linseed oils are used as solvents for these dyes.

The hands and arms and faces and clothing of the workers in this factory are covered with the dyes and other chemicals used in the manufacture of the inks, papers, and ribbons, but no cases of occupational dermatitis have ever occurred there. At the end of the day's work, the dye is removed from the hands of the workers by first rubbing in vaseline, which absorbs most of the dye. The vaseline is then wiped off with a cloth. The hands are then washed in soap and water; and if there is still some dye remaining, the hands are dipped in a weak solution of potassium permanganate and then into a weak solution of sodium bisulphide. This removes practically all the dye.

Although it is possible or even probable that cases of occupational dermatitis may occur among workers in factories manufacturing these products, if they should be hypersensitive to any of the various chemicals and dyes used in their work, yet all of the factories replying to our queries stated that they had no such cases. Typists, stenographers, hectograph, "ditto" machine, and stencil-machine operators and other office workers are much less exposed to the action of these chemicals than are the workers engaged in the manufacture of carbon paper, typewriter ribbons, etc., and cases of dermatitis proved to be caused by these products are of even rarer occurrence among the latter group.

SUMMARY

A supposed outbreak of occupational dermatitis among a group of 750 office workers was investigated, and from a study of the cases and of the work processes and from the results of patch tests performed with the materials handled, it was found that the skin diseases were of various kinds and were not of occupational origin.

Patch tests performed on 50 clinic patients suffering from skin diseases showed that none of them was sensitive to any of 12 different kinds of carbon paper which, in the aggregate, contained all of the usual dyes and chemicals used in the manufacture of carbon papers.

A factory and its workers engaged in the manufacture of carbon paper, typewriter ribbons, hectograph ribbons, and hectograph inks were examined and the process of manufacture was studied, and no cases of occupational dermatoses were found although the skins of workers were covered with the various chemicals used.

CONCLUSIONS

Before a diagnosis of occupational dermatitis is made in an office worker, the physician should obtain an accurate clinical history, should study at first hand the actual work performed, and should make patch tests with the substances handled by the worker. If he neglects to do this, he may cause unjustified alarm among the workers and unnecessarily disrupt the business of the office.

Proved cases of occupational dermatitis from carbon paper and carbon copies are exceedingly rare.

STUDIES ON THE INFECTION OF DOGS WITH TROPHOZOITES OF *ENDAMOEBA HISTOLYTICA* BY THE ORAL ROUTE

A Preliminary Report[1]

By John Clyde Swartzwelder, Ph. D., *Department of Tropical Medicine, Tulane University, New Orleans, La.*

The observations of a few workers indicate that, at least under certain conditions, there is a possibility that the trophozoites of *Endamoeba histolytica* may produce infection in a susceptible host when taken by the oral route. In 1905, Craig (*1*) stated that by far the most successful manner in which to produce amoebic dysentery in kittens was by feeding the animals infected feces containing numerous motile forms. The inoculum was mixed with milk and fed to kittens which had been kept without food for 24 hours. Sixty-five percent of the animals were infected in this manner. Walker and Sellards (*2*) (1913) produced amoebic infection in three of four human volunteers who were fed material from dysenteric stools containing numerous motile trophozoites. The incubation periods in the three infected subjects were 1, 4, and 44 days, respectively, indicating, in the first two cases at least, that the infections were not caused by the presence of a few cysts which may have been in the inoculum but which were not detected by microscopical examination.

Wagner (*3*) (1935) reported amoebic invasion of the gastric mucosa of the dog. Also, spontaneous infections occurred in normal dogs housed with dogs infected with *Endamoeba histolytica,* suggesting that the infections were produced through contact with the feces containing amoebic trophozoites. To explain this mode of infection, Wagner suggested the possibility of resistant types of trophozoites which might withstand the action of the digestive secretions. Unfortunately, the dogs had been previously fed on liver, which has been shown by Faust and Kagy (*4*) (1934) to produce encystation of amoebae when given to the dog by mouth.

[1] Conducted in part as a project of the Amebiasis Unit of the National Institute of Health at Tulane University.

Deschiens (*5*) (1934) reported unusual resistance of trophozoites to low temperatures and to alternate exposures to high and low temperatures, and noted the possibility of growth and encystment under certain environmental conditions outside the body.

Since several workers have reported failure to infect animals with the trophozoite stage of *Endamoeba histolytica* by the oral route, it is important to determine conclusively whether infection may be produced in the dog by the ingestion of trophozoites and under what conditions this may occur. According to Wright (*6*) (1936), in something less than 5 percent of normal subjects with no symptoms of indigestion no HCl whatever is secreted. Furthermore, the constituents of the gastric juice vary under certain conditions. Whether the ingestion of trophozoites of *E. histolytica* will produce infection in cases of achlorhydria, in the fasting stomach, or under various degrees of gastric stimulation, is not known.

The following experimental studies were designed to determine whether infection may be produced in the dog by the ingestion of trophozoites of *Endamoeba histolytica.* Also, attempts were made to determine the concentration of free and combined HCl which trophozoites may withstand *in vivo.*

Twenty-seven healthy young dogs, free from natural amoebic infection, were used in this study. Dogs experimentally infected with a human strain of *Endamoeba histolytica* provided the material used for the inoculations. This strain has been maintained in dogs for 3 years. It should be noted that the dog almost invariably passes only trophozoites in its stools, although Andrews (*7*) (1932) has reported cysts of a dysentery-producing amoeba in a dog at Baltimore, and Faust and Kagy (*4*) (1934) have shown that dogs on a liver diet may pass cysts in their stools. In studies on the effect of various foodstuffs on amoebic lesions, Faust (unpublished data, cited in Faust, Scott and Swartzwelder, 1934) (*8*) demonstrated that a salmon diet tended to produce a fulminating dysentery in amoeba-infected dogs, and that cysts were never seen in the stools of these animals. The animals which provided the inocula in the present study were fed on a salmon diet to exacerbate the infections as an additional precaution against the presence of cysts in their excreta. A dysenteric condition developed in each of these animals; in fact, some donor animals died from the infection during the experimental work, and Faust and Swartzwelder (*9*) (1935) reported that one animal harbored an infection with this strain for 1½ years, without need for exacerbation by dietary means. The material used for inoculation was obtained by aspiration of blood and mucus containing active trophozoites from various levels of the large intestine by means of a long glass tube and syringe bulb (Faust, 1931) (*10*). This material was carefully examined to make certain that neither cysts nor precystic forms were present, and invariably not a single cyst or precyst was observed.

Eight dogs were inoculated *per os* with 5 to 10 cc of material containing only active trophozoites of *Endamoeba histolytica*, to determine whether the inoculum could pass through the stomach and small intestine in a viable condition. The inocula were administered either in distilled water or without any fluid, and on a fasting stomach (12 to 24 hours after the last feed). The animals were sacrificed from 15 minutes to 1½ hours after inoculation, and in all dogs active trophozoites were found either in the stomach or small intestine. Many of these forms were successfully cultured on liver-infusion agar-slants (Cleveland and Collier, 1930) (*11*), indicating that, in the dog, trophozoites which are ingested on a fasting stomach may pass through the stomach and reach the ileum in a viable condition. In some of the eight animals, active trophozoites were present in a medium which gave a positive reaction for free acid. No cyst formation was noted during the passage of the amoebae through the stomach, although trophozoites which had rounded up were frequently observed in the stomach and duodenum. Degenerate amoebae also were observed in the stomach of these animals.

Attempts were made to produce infection (i. e., tissue invasion) by feeding recipient dogs motile trophozoites of *Endamoeba histolytica* obtained from donor dogs on a salmon diet. A small volume (3 to 7 cc) of material containing numerous amoebae was used to inoculate the animals in order that positive results would not be attributed to overloading the stomach with infective material. Amoebic infection was produced in 5 of 13 dogs which were fed trophozoites in a medium free from cysts. The inoculations were usually made from 3 to 24 hours after the last feed, but in a few cases the inoculum was administered shortly before the animal was given its daily ration of food. The incubation periods for the five infected dogs ranged from 4 to 16 days. This is apparently the first time that infection with trophozoites *per os* has been produced experimentally in dogs, where every step in the procedure was checked and a parallel series of uninfected animals was maintained as controls.

Since dogs may ingest their own feces or those of other dogs, it is possible that natural amoebic infection in canines is not always of direct human origin. Epidemics of amoebic dysentery among dogs might well be explained by the rapid anus-to-mouth transmission of the infection from one animal to another. The oral method of inoculation with trophozoites provides also additional evidence of biological interest. Apparently there is no need for the interpolation of a cyst stage with that of the vegetative or trophic form of this amoeba to insure the continuance of its existence *in vivo*. The ability of Faust (*10*) (1931) to produce amoebic infection in dogs by intracecal inoculation with trophozoites of *Endamoeba histolytica* also provides evidence in favor of this conclusion. Furthermore, active trophozoites,

obtained from the lumen of the large intestine of the dog, apparently have the ability to invade tissue, since they proved infective when given *per os* to other animals.

In a series of five dogs, attempts were made to determine the degree of resistance of trophozoites to gastric acidity *in vivo*. The animals were fed 100 cc of beef extract and a small quantity of raw meat prior to inoculation in order to stimulate gastric secretion. Samples of the gastric juice were withdrawn and titrated for free and total acidity before and after inoculation, with Töpfer's reagent being used for the former and phenolphthalein for the latter. Viable trophozoites were found in the stomach after exposure for 1 hour to amounts of free HCl requiring from 12 to 40 cc of N/10 NaOH to neutralize 100 cc of gastric juice.

It is possible that at times the resistance of the trophozoites to free acid may be greater than these figures indicate. Viable trophozoites were present in the gastric contents when the total acidity, representing both the free HCl and that which is combined with protein, exceeded the values previously given for free acid. The trophozoites remained active in gastric contents which were negative for free HCl but contained combined acids, but there was a tendency for the amoebae to round up in the presence of free acid. Occasional pseudopodial movement or cultures of these rounded forms indicated that they were viable. Certain amoebae remained viable longer than others. This could not be correlated with the presence or absence of cytoplasmic inclusions. Concentrations of free acid requiring more than 40 cc of N/10 NaOH to neutralize 100 cc of gastric juice were lethal to the trophozoites. Little or no free acid was present in the gastric contents of some animals for a brief period after inoculation, and, since the stomach of the dog frequently empties very rapidly, the lack of free acid during this period may account for infection in some animals. However, the lack of free acid is definitely not necessary for the passage of active trophozoites through the stomach. It should be noted that Dobell (*12*) (1927) found that trophozoites of *Endamoeba histolytica* could survive constant exposure to N/20 HCl at 37° C. *in vitro* for 1 hour, but that they remained viable for only 20 minutes in this concentration of free acid when kept at room temperature. He concluded that the resistance of trophozoites to free acid is at a maximum at body temperature.

In summary, 5 of 13 dogs became infected following the ingestion of trophozoites of *Endamoeba histolytica* in a cyst-free medium. In at least 14 out of 22 animals trophozoites passed through the stomach and small intestine in a viable condition. Trophozoites of *Endamoeba histolytica* were observed to withstand *in vivo* concentrations of free HCl up to amounts requiring 40 cc of N/10NaOH to neutralize 100 cc of gastric juice. High concentrations of combined HCl did not

affect the motility or viability of the trophozoites, although there was a tendency for trophozoites to round up in the presence of free acid.

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PROGRESS IN OYSTER CONDITIONING

With Report of Experiments at the Demonstration Plant, Norfolk, Va.

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Although the subject of shellfish conditioning has been studied for some 20 years, and several plants are being operated successfully on a commercial scale, the industry apparently feels that there should be further proof regarding the need of conditioning shellfish for market and the practicability of any such processing. During the past year the Shellfish Committee of the Engineering Section of the American Public Health Association undertook the task of assembling such data as were available on the design and operation of conditioning plants and presented evidence showing why the matter should receive serious consideration by all who are interested in building up the shellfish industry.

Water storage means (1) holding shellfish in bins or tanks supplied with water of approved purity, (2) storage in floats, or (3) bedding near shore. By cleansing is meant the placing of shellfish in water of an accepted quality at such temperatures and under such conditions that they "drink", thereby eliminating contamination. For many years it has been the practice to transplant oysters and clams from moderately polluted beds to approved areas for cleansing. The more general term of "conditioning" applies to either of the methods discussed or a combination of the two, depending on the nature of the shellstock and how it is to be marketed.

It is well known to the industry that oysters taken from deep waters often lose their liquor unless kept in shallow waters until their muscles

become adjusted to the change in pressure; that unless oysters are given an opportunity to eject the sand, grit, or other irritating material, they open their shell when stored dry and lose their liquor; and that dredged oysters with broken bills usually replace their liquor if held in water for a short period.

At the present time there are less than a dozen conditioning plants in the world operating on a commercial scale. The plant at the Conway station in Wales for the cleansing of mussels has been in operation since 1916. After some 10 years of experimental work a similar plant for cleansing oysters was completed at this station in 1934. In New York the conditioning plant which has been operated by the Bluepoints Company since 1926 is well known, as are the several smaller plants in the neighborhood. In Massachusetts three plants for the cleansing of clams have been built, two of which have been operated since 1931. In New Jersey the State department of health constructed three experimental plants of sufficient size to be operated on a commercial scale and mainly for the purpose of demonstrating to dealers in that State the feasibility of this method as a substitute for storage in natural waters of questionable quality.

In Virginia the State department of health last year adopted the policy that oysters or clams shall not be held in storage on floats in natural waters, except by special permission. A permit is issued when the waters are found by survey to be free from contamination, and when the owner agrees that the float be held in the limited space approved, and when all possible precautions are taken by the employees to prevent contamination of the shellfish. Compliance with these requirements necessitates seeking locations at considerable distances from the packing plants, and sufficiently removed from channels to eliminate the danger of chance contamination from passing boats. Maintenance of floats under such conditions involves items of expense in handling and transporting, and in the risk of loss during a storm.

Notwithstanding the experience elsewhere, the State department of health was not in a position to assure Virginia dealers that the relatively new processing method would be entirely satisfactory on a commercial scale where higher water temperatures prevail during the autumn and early spring. For this reason it was deemed advisable to build a plant of sufficient size to demonstrate the practicability of water storage in tanks and to determine particularly the quantity of water required to maintain enough oxygen in the water for the oysters to function. This is one of the items of cost in this method of plant operation.

DEMONSTRATION PLANT AT NORFOLK, VA.

Under a State-wide project, which had been approved by the Works Progress Administration, it has been possible to build a demonstra-

tion plant on Willoughby Spit in the city of Norfolk. The plant was completed late in November 1936, at a cost of $2,800. Practically the entire cost of construction, of most of the laboratory apparatus and supplies, and of operation has been paid by the Works Progress Administration.

Description of plant.—The plant is a two-story wooden frame structure with concrete foundation and floor, 21 feet by 25 feet in plan and 18 feet high. The first floor contains the pump room, the water storage tank, and the two wooden conditioning tanks; the upper story contains the laboratory, which is equipped for all chemical and bacteriological examinations desired. The conditioning tanks, which are very similar to the tanks designed by Dodgson at Conway and explained in his book, *Report of Mussel Purification*, are of two different sizes. The larger is 8 feet long by 4 feet wide and 3 feet high; the smaller, 4 feet by 2 feet and 3 feet high. Both are of the same design, with false grated bottom raised 4 inches off the true bottom, which has a slope of 1;50, and penstock gates to flush out the debris, sedimentation, and feces without removing the oysters. One of these tanks is so equipped that air can be forced through the water in the tank. Sea water is pumped into the water-storage tank by means of a 2½-inch suction intake line extending about 50 feet into the water. The pump used is a 50-g. p. m. centrifugal pump, to which is attached an air pump. The intake is in that part of Hampton Roads which has been restricted, for some 10 years by the State department of health, for the removal of shellfish.

The most probable number (M. P. N.) of the coli-aerogenes group in 100 cc ranged from 9 to 460, with a median of 90 during these experiments. This is equivalent to approximately 50 percent of the 1-cc tubes being positive for the coli-aerogenes group. As the water is flowing into the storage tank, a chlorine solution made from a standard commercial hypochlorite is allowed to mix with the water to sterilize it. A thorough mix is assured by means of a round-the-end baffle arrangement at the influent end. At the effluent end the same type of arrangement will rid the water of excess chlorine by the addition of sodium thiosulphate, if so desired. This storage tank, which holds 1,440 gallons, is divided into two parts so that as the water flows into the conditioning tank it can be aerated by means of air being pumped through diffuser tubes. Since the storage tank is at a higher elevation than the conditioning tanks, flow is by gravity to them. This water was of United States Public Health Service drinking-standard purity.

DISCUSSION OF WATER STORAGE

It was decided to determine, first, the amount of water required by oysters when stored for varying periods at varying temperatures in

order to maintain sufficient oxygen in the water to insure natural activity, namely, "drinking"; for the oyster is conditioned and cleansed not by the chlorine in the water but by its own biological and physiological activity. In short, man sterilizes the water; the oyster cleans and conditions itself—if placed in the proper environment.

In 1914, Round (*1*) observed that oysters will actively eliminate bacteria at all temperatures above 48° F., but at 41° F. there is no reduction in the number of bacteria until after 5 days. In 1921, T. C. Nelson (*2*) reported that between 42° F. and 45° F. lies a "critical temperature" above which there is active feeding and below which almost no food is taken. In the 1925 Annual Report on Sea Fisheries (England and Wales), 46° F. is given as the temperature below which the voiding of the contents of the alimentary canal ceased to be general, although a majority of the oysters in the cleansing tank showed signs of physiological activity down to about 40° F. Galtsoff (*3*), in 1928, concluded that hibernating oysters do not exhibit any adaptation to low temperatures and that they begin to produce a current as soon as the temperature rises above the critical point. In the majority of oysters the current begins to flow when the temperature reaches 46.5° F. J. R. Nelson (*4*) stated in 1934 that, where cleaning is desired in 10 or 12 hours, a temperature of 50° F. or slightly higher is desirable; but a period of 24 hours or more is required when the temperature is below 50° F. but above 41° F. At the Bluepoints Plant, West Sayville, N. Y., it has been found that when the temperature in the tanks drops below 58° F., 7 to 10 gallons of water per bushel of oysters per hour is sufficient when oysters are stored for a week or more.

The oysters used for the present studies were tonged from approved areas, generally, and transported in baskets to the plant by boat. Before being placed in the tanks, the oysters were hosed with water under pressure, "culled", measured, and placed in the tank to a depth of 6 to 8 inches. In 20 of the runs the quantity of oysters used varied between 6¾ and 9 bushels. In five runs it was approximately 1¼ bushels. The Virginia oyster bushel, the measure which was used, as defined by law is 1¾ cubic feet. Water which had been chlorinated and in which the chlorine had been allowed to disappear was permitted to flow into the tanks to the desired depths. The fill and draw method was used during the entire study. Temperature readings, dissolved oxygen content, activity of the oysters, bacteriological examination of water and oysters, and other pertinent observations were made periodically.

In determining the dissolved oxygen content of the water, the Winkler method, as specified by Standard Methods, was used. This proved satisfactory, since the sea water had little oxidizable matter and no other interfering substance. In computing the amount of

oxygen consumed by the oysters, no correction was made for the absorption of oxygen from the air by the water.

The bacteriological examinations of the oysters were made from a composite sample of the shell liquor of five to seven oysters. Examinations of water samples for bacteriological density were also made according to Standard Methods.

Temperature readings varied from 41° F. to 55° F. No attempt at first was made to regulate the temperature, although this was done later. There is a definite correlation between the amount of water that the oysters "drink" and the temperature, which can be measured by the amount of dissolved oxygen that they consume. It

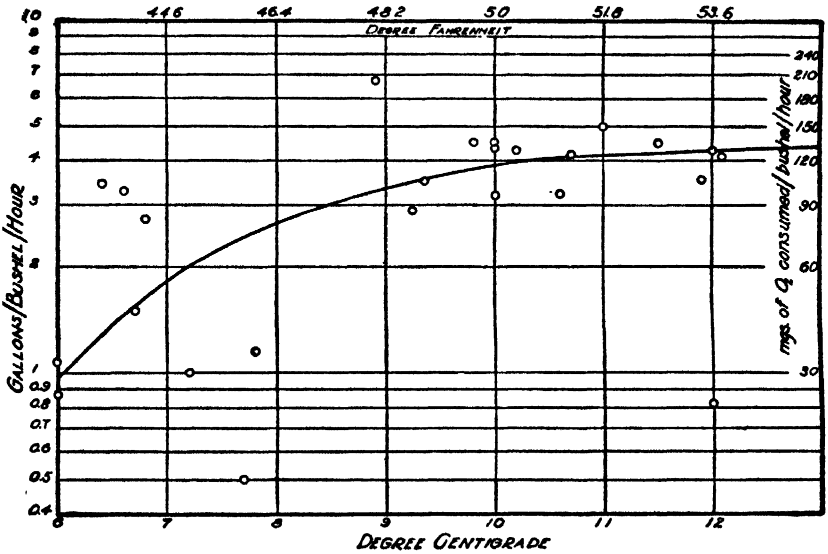

FIGURE 1.—Gallons of water required to keep oxygen content constant (assuming that the water contains 8.0 p. p. m. (30 mg/gal) of dissolved oxygen).

is also believed that the amount the oysters "drink" can be measured by the time it takes oysters to remove the turbidity from a water.

As can be seen in table 1 and figure 1, about 120 milligrams of dissolved oxygen were consumed per bushel of oysters per hour at 50° F., approximately 100 milligrams at 48° F., and 75 milligrams at 46° F. At temperatures below 46° F., the milligrams of oxygen consumed per bushel per hour decreases rapidly, although not uniformly.

If it is assumed that we were to have continuous flow, and that the incoming water contained 8 parts per million of dissolved oxygen (say 30 milligrams per gallon of water), then the amount of water which would be necessary to keep the dissolved oxygen content at a constant level would be about 4.0 gallons per bushel of oysters per hour at a temperature of 50° F., approximately 3.3 gallons at 48° F., and 2.5 gallons at 46° F.

Table 1.—*Milligrams of dissolved oxygen consumed per bushel of oysters per hour at different temperatures*

Average temperature range		Number of runs	Milligrams of O_2 consumed per bushel per hour		
° C.	° F.		Maximum	Minimum	Median
5.9 to 7.8	42 6 to 46.1	9	108	15	85
8.9 to 9 8	48 to 49.6	4	202	87	122
10 to 10 7	50 to 51.2	6	134	96	126
11 to 12.1	51.8 to 53.8	5	148	104	128

Table 2.—*Water required in gallons per bushel of oysters per hour at different temperatures to keep dissolved oxygen at constant level*

Average temperature range		Number of runs	Gallons of water required per bushel per hour		
° C.	° F.		Maximum	Minimum	Median
5.9 to 7.8	42 6 to 46.1	9	3.4	0.5	1.1
8.9 to 9 8	48 to 49.6	4	6.7	2.9	4.1
10 to 10.7	50 to 51.2	6	4.5	3.2	4.2
11 to 12.1	51 8 to 53.8	5	4 9	3 5	4.3

The mortality, based on numbers of oysters during any given run, varied from 5 to 0.5 percent; the median being 1.4 percent. With a conditioning period of not more than 72 hours, the mortality rate should not be in excess of 1.5 percent.

Graphically, the results of each individual run may be expressed as shown in the accompanying sample graphs, runs 8*a*, 8*b*, 8*c*, and 8*d*, and run 11 (figs. 2 and 3). The solid line represents actual observations, the dotted line represents the computed observations, which were calculated so that the rate in one graph may be compared with that of another. The broken line, without circles for points, represents the temperature. The graph in figure 1 is the summation of all these runs.

From these tables and graphs it will be noted that at 48° F. the oysters were active, as indicated by their consumption of oxygen. This finding has a practical application of vital concern to dealers who transplant oysters during the autumn and spring months to approved areas for cleansing. Undoubtedly the requirement that oysters remain in clean waters a period of not less than 30 days when the temperature ranges between 50° F. and 60° F. is unnecessarily conservative. Accepting the opinion, on which there seems to be general agreement, that oysters clean themselves naturally when drinking uncontaminated water, the results obtained (tables 1, 2, and 3) seem to indicate strongly that a much shorter period than 30 days would be safe.

Until early in March, bacteriological determinations were only incidental, the scores, except in two instances, being very low. Since then the work carried out has been for the main purpose of determining

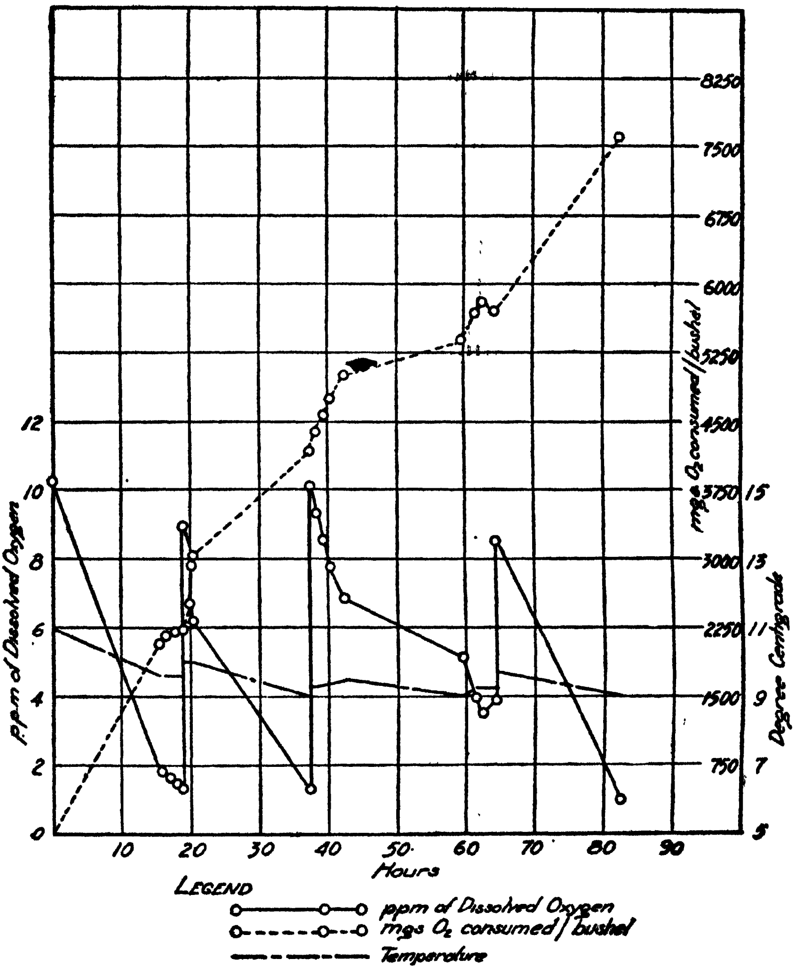

FIGURE 2.—Runs 8a, 8b, 8c, and 8d. Temperature, 9.0°–11.0° C. (48.2°–51.8° F.). Salinity, 1.010 sp. gr. Gallons of water, 553, 552, 535, and 550. Bushels of oysters, 8.25. Oysters tonged from waters with temperature of 11° C. (51.8° F.), salinity, 1.009 (Lot 5). Oysters placed in tank within 6 hours from time of tonging. Turbidity removed in 2 hours on second stage of run. Time, 5 p. m. January 26, 1937. Mortality, 1.1 percent.

how quickly oysters are cleansed in water storage. So far, four separate lots of 1¼ bushels each, and one lot of 9 bushels have been used for study. The oysters used for these investigations were obtained either from known polluted areas or from approved areas and artificially contaminated.

The oysters were hosed thoroughly, "culled", measured, and placed in the conditioning tanks. Chlorinated sea water to which additional chlorine was added was allowed to flow into the tank until the oysters were covered. The residual chlorine was then between 3 and 5 p. p. m. After allowing this to stand for 20 to 30 minutes, the purpose of which is to sterilize the shell, additional chlorinated sea water, in which the free chlorine content was very low, was added. This reduced the residual chlorine to 0.5 to 1 p. p. m. In about 3 hours the residual

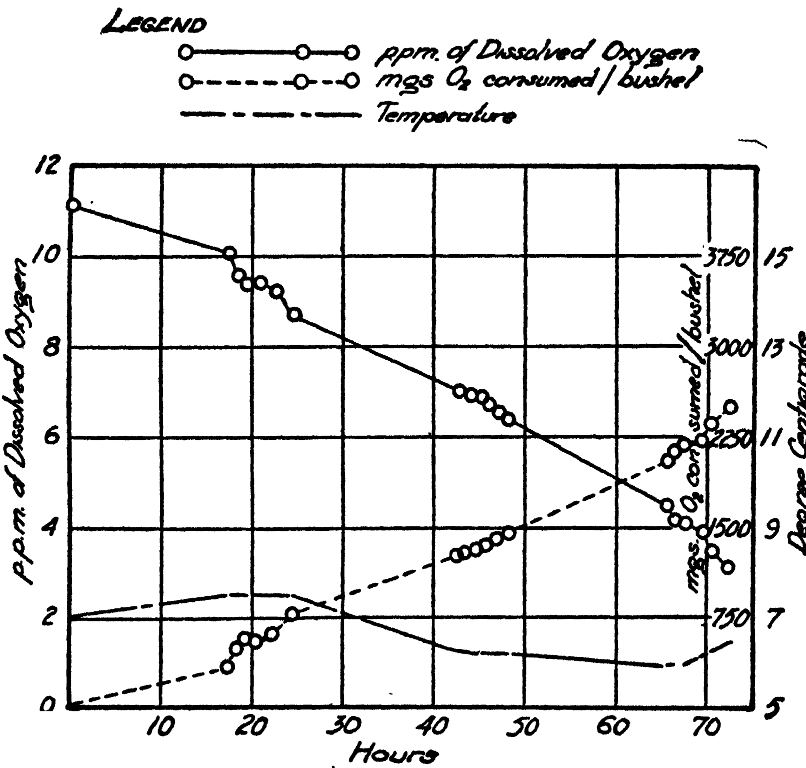

FIGURE 3.—Run 11. Temperature, 5.9°–7.5° C. (42.6°–45.5° F.). Salinity, 1.0125 sp. gr. Gallons of water, 551. Bushels of oysters, 6.75 (Lot 8). Oysters taken from commercial tonging boat; dry storage of 4 days before start of run. Time, 4 p. m., February 15, 1937. Turbidity removed in 48 to 65 hours. Mortality, 3.7 percent.

chlorine had disappeared, so that the oysters could function normally. The temperatures used varied from 49° F. to 55° F. In practice, it would be advisable to drain off the heavily chlorinated water and then add the sea water of United States Public Health Service drinking-standard purity. This would save about 3 hours per run. Although the fill and draw system was used in these studies, it might, in practice, be advisable to have continuous flow.

The bacteriological reduction of the coli-aerogenes density in the shell liquor of oysters kept in the conditioning tanks for a period of 24

hours and greater was between 96 and 98 percent when the oysters were moderately polluted, as shown in table 3.

TABLE 3.—*Bacteriological reduction during period of conditioning*

Lot no.	Average temperature (°F.)	Hours of run	Bacteriological test, coli-aerogenes in shell liquor				Percent reduction of coli-aerogenes
			Start		End		
			Score	M. P. N.	Score	M. P. N.	
1	49	24	230	5,400	50	210	96
2	51	6	5	170	0	0	
3	51	72	500	17,000	14	330	98
4	50	6	3	78	0	0	
5	54	45	320	9,200	4	130	98

SUMMARY AND CONCLUSIONS

(1) Conditioning of shellfish is practiced for the purpose of improving the appearance and keeping qualities and for the removal of slight contamination which may be present. Methods most commonly used consist of (1) relaying shellfish from doubtful areas to clean waters, (2) storage on floats in approved locations, and (3) more recently, storage for varying periods (depending on the purpose in view) in water-tight tanks containing sea water free from contamination.

(2) In order to demonstrate that conditioning in tanks is practical for climatic conditions in Virginia, a plant was built on Will loughby Spit in Norfolk in 1936, sufficiently large to condition approximately 9 bushels at a time. During the 5 months of study, 165 bushels of oysters have been used in these studies, with water temperatures ranging from 41° to 55° F.

(3) It has been found that for conditioning oysters as they would be in commercial practice about 4 gallons of water per bushel of oysters per hour at a water temperature of 50° F. are required; below this the requirements are approximately 3¼ gallons at 48° F. and 2½ gallons at 46° F. At lower temperatures the quantity of water necessary decreases rapidly. This evidence shows that the oysters have become uniformly active at 48° F. and nearly as active as they are at 53° F.

(4) Results from five bacteriological runs showed reductions of not less than 95 percent in 30 hours at a temperature range between 49° and 53° F.

(5) The evidence points strongly to a modification of the requirements for relaying oysters, and indicates that a shorter period at 50° F. and possibly at 48° F. is safe from a public health standpoint.

(6) It is believed that conditioning in tanks is commercially feas-

ible in a plant having modern equipment, and that a uniformly good product can be had.

ACKNOWLEDGMENTS

The helpful services given by those who have visited the plant and with whom the authors have been in correspondence is gratefully acknowledged, and particularly appreciation is extended to Senior Sanitary Engineer R. E. Tarbett and Sanitary Engineer L. M. Fisher of the Public Health Service, and W. A. Chipman, Yorktown Experimental Station, United States Bureau of Fisheries.

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TREATMENT OF MALARIA WITH SULFONAMIDE[1] COMPOUNDS

The following is believed to be the first report on the use of sulfonamide compounds in the treatment of malaria. It is the translation of a report, by Dr. Amonario Díaz de León, of Cardenas, San Luis Potosi, Mexico, furnished by the Pan American Sanitary Bureau, and is to be published in an early issue of the Boletín, issued by that Bureau. This report is published here with the hope that a cautious use of the drug by others may determine whether or not it has real value in the treatment of malaria. As a matter of precaution, mention is made here that reports of idiosyncrasies to this drug are appearing in the literature and that it may not be free from toxic effects. The report follows:

FIRST CASES OF MALARIA TREATED WITH RUBIAZOL ROUSSEL [2]

In view of the discovery of plasmochin and atabrine after experiments with various colorants, and of the bactericidal properties of

[1] In practically all scientific literature in this country the "ph" in the word "sulphur" and its derivatives has been changed to "f." Therefore, in conformity with almost universal usage, and in the interest of orthographic standardization, this change will be adopted by the Public Health Service. This form has been officially recognized by the American Medical Association and the American Chemical Society, and is used in the latest (eleventh) edition of the Pharmacopoeia of the United States. Backed by the usage in British scientific journals, the Public Health Reports has held to the original spelling in the face of the increasing tendency in America to the simplified form. As the change in spelling involves no loss in the etymological history of the word, it can be adopted with less philological resistance than would be the case if it resulted in a sacrifice of historical root-stems.—Ed.

[2] Rubiazol is the French name of one of the sulfonamide preparations, better known under the trade names of Prontosil and Prontylin.—Ed.

such dyes as Rubiazol Roussel in streptococcic, staphylococcic, and gonococcic infections, Dr. Díaz de León decided to try it in the treatment of malaria, with such completely satisfactory results in his 15 cases of benign tertiary malaria that he believes its antimalarial properties worth further investigation.

Dr. Díaz de León recalls that the treatment of malaria should be adapted to each individual case, after due consideration of the species of the parasite (*vivax, falciparum, malariae*), its forms (schizont, gamete), the duration of the illness, and the therapeutic properties of the specific drugs—quinine and atabrine (schizontocidal) and plasmochin (gametocidal). The new antimalarial remedy would probably be classed with the former, since it was tried only in the benign tertian form. Dr. Díaz de León describes the first 4 cases of the 15 which he treated, as follows:

The first patient clearly suffered from benign tertian fever, as he underwent three fever attacks and the microscope revealed *P. vivax*. He was given several tablets of Rubiazol, with instructions to take six per day, two after each meal. Five days later he returned for consultation, feeling perfectly well, and having suffered no attacks during that period. He was advised to continue taking Rubiazol, one tablet after each meal, until one bottle had been used, and to report the results, which were excellent.

The second and third cases were in two brothers who had traveled together through a malarial region, and who suffered the first attack of fever on the same day. Before the treatment, an examination revealed *P. vivax* in the blood of both patients. Rubiazol tablets, two after each meal, were prescribed, for 4 days, then one tablet after each meal until the contents of one bottle had been taken. These two patients suffered only the initial attack, before treatment, and became perfectly well. Seven days after the first consultation an examination of the blood was made and no parasite was found.

The fourth case was in a woman coming from a malarial region. She had had an abortion, and 4 days later had suffered from general malaise, lack of appetite, and headache. Three days following these disturbances she felt an intense chill, followed by a very high temperature, ending in copious sweat. This cycle of chill, high fever, and sweat was repeated every third day for six times, the last being one day before she came for examination. Though her diagnosis of "calentura" was corroborated by the symptoms, I proceeded to make a blood smear, staining it with Tribondeau's formula as I had done in the other cases studied, and found unmistakable, abundant parasites of benign tertian. I immediately prescribed Rubiazol tablets according to the system followed in the other cases. On the day following the consultation, when the patient had begun treatment, the last attack appeared (on the day it was due), but lightly, since

the chill was slight, the temperature rose only to 38° C., and disappeared in 3 hours, in contrast to the former attacks which lasted 8 or 10 hours. Because of this attack, on the morning following I gave an intramuscular injection of Rubiazol, without stopping the tablets. The attacks did not return and 7 days after the beginning of treatment the patient returned home decidedly improved and taking only three tablets per day. On the twentieth day I had the opportunity of seeing her completely well. This case was the only one in which a second attack occurred,[3] and even in that attack the effect of the Rubiazol was seen. It was also the only case in which I used this drug by injection.

After having treated 15 cases of benign tertian fever with complete success, I am sure that Rubiazol is an effective, specific drug for this form of malaria. I am waiting to experiment with it in other forms later on, since this year the late arrival of the rains has somewhat modified the incidence of malaria in nearby endemic regions.—*Dr. Amonario Díaz de Leoñ*, Cardenas, San Luis Potosi, Mexico. September 8, 1937.

HOW EXPENDITURES FOR SELECTED PUBLIC HEALTH SERVICES ARE APPORTIONED—A CORRECTION

In the article entitled "How Expenditures for Selected Public Health Services Are Apportioned", which appeared in the PUBLIC HEALTH REPORTS, vol. 52, no. 40, issue of October 1, 1937, the figures in the columns headed "Percentage distribution of expenditures" of tables 2 and 3, pages 1387 and 1388, should have been whole numbers instead of decimals.

DEATHS DURING WEEK ENDED SEPT. 25, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 25, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	7,696	7,309
Average for 3 prior years	7,145	
Total deaths, first 38 weeks of year	330,875	331,253
Deaths under 1 year of age	505	551
Average for 3 prior years	533	
Deaths under 1 year of age, first 38 weeks of year	21,346	21,131
Data from industrial insurance companies:		
Policies in force	69,872,337	68,504,572
Number of death claims	11,867	11,065
Death claims per 1,000 policies in force, annual rate	8.9	8.4
Death claims per 1,000 policies, first 38 weeks of year, annual rate	9.9	10.0

[3] Presumably Dr. Díaz de Leoñ means here an attack occurring after treatment had begun.—Ed.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (------) indicate that cases or deaths may have occurred, although none was reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 2, 1937, and Oct. 3, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct 2, 1937	Week ended Oct. 3, 1936	Week ended Oct. 2, 1937	Week ended Oct. 3, 1936	Week ended Oct 2, 1937	Week ended Oct. 3, 1936	Week ended Oct 2, 1937	Week ended Oct. 3, 1936
New England States:								
Maine	1	-------	-------	-------	8	7	1	0
New Hampshire	-------	-------	-------	-------	1	17	0	0
Vermont	-------	-------	-------	-------	6	3	0	0
Massachusetts	1	5	-------	-------	11	37	0	0
Rhode Island	-------	-------	-------	-------	-------	-------	0	1
Connecticut	3	-------	2	2	5	4	0	1
Middle Atlantic States:								
New York	23	11	[1] 12	[1] 8	115	42	9	4
New Jersey	7	6	9	7	24	8	0	3
Pennsylvania	19	16	-------	-------	234	23	4	4
East North Central States:								
Ohio	33	34	15	1	94	11	3	7
Indiana	28	17	14	27	3	4	1	0
Illinois	35	18	9	11	45	11	8	5
Michigan	24	9	2	1	15	5	1	4
Wisconsin	2	5	35	17	28	12	1	2
West North Central States:								
Minnesota	3	2	-------	-------	6	5	0	0
Iowa	5	8	5	-------	3	1	0	0
Missouri	38	6	22	28	15	-------	3	2
North Dakota	-------	2	-------	-------	-------	-------	0	0
South Dakota	-------	1	-------	-------	-------	2	0	0
Nebraska	-------	-------	-------	-------	4	1	2	0
Kansas	5	6	2	1	2	2	0	0
South Atlantic States:								
Delaware	-------	-------	-------	-------	-------	2	0	0
Maryland [2] [3]	9	21	3	3	2	4	3	4
District of Columbia	2	11	-------	-------	3	-------	0	5
Virginia	39	25	-------	-------	16	-------	1	0
West Virginia	34	19	5	5	9	-------	1	2
North Carolina	139	112	1	1	21	2	3	4
South Carolina [3]	23	16	122	79	-------	-------	1	1
Georgia [3]	52	40	-------	-------	-------	-------	2	0
Florida [3]	22	7	3	-------	-------	-------	0	0
East South Central States:								
Kentucky	24	32	3	-------	12	3	4	3
Tennessee	39	50	13	10	47	-------	1	2
Alabama [3]	29	35	24	2	1	1	0	0
Mississippi [2] [3]	17	23	-------	-------	-------	-------	1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 2, 1937, and Oct. 3, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct 2, 1937	Week ended Oct. 3, 1936	Week ended Oct. 2, 1937	Week ended Oct. 3, 1936	Week ended Oct. 2, 1937	Week ended Oct. 3, 1936	Week ended Oct. 2, 1937	Week ended Oct. 3, 1936
West South Central States:								
Arkansas	20	10	5		3		3	0
Louisiana [3]	14	18	3	5	1	3	0	1
Oklahoma [4]	7	10	31	26	1	1	1	2
Texas [3]	40	31	135	28	13	4	2	0
Mountain States:								
Montana					16	2	1	0
Idaho			4	6			0	0
Wyoming					9		0	0
Colorado	18	6			8	3	0	1
New Mexico	2	6		2	7	9	0	0
Arizona	6	3	18	16	3	3	0	0
Utah [2]	2		10		95	1	0	0
Pacific States:								
Washington	4	3			6	4	0	0
Oregon		4	11	14	8	3	0	0
California	15	36	16	27	18	30	1	0
Total	784	664	534	327	918	270	53	58
First 39 weeks of year	16, 979	17, 737	276, 830	141, 743	245, 396	269, 282	4, 499	6, 230

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers	
	Week ended Oct 2, 1937	Week ended Oct 3, 1936	Week ended Oct 2, 1937	Week ended Oct. 3, 1936	Week ended Oct 2, 1937	Week ended Oct. 3, 1936	Week ended Oct. 2, 1937	Week ended Oct. 3, 1936
New England States:								
Maine	8	0	4	11	0	0	3	1
New Hampshire	0	0	3	5	0	0	0	0
Vermont	2	0	3	5	0	0	6	0
Massachusetts	16	1	64	57	0	0	3	2
Rhode Island	0	0	8	12	0	0	1	0
Connecticut	8	0	19	8	0	0	2	2
Middle Atlantic States:								
New York	45	6	128	149	0	0	29	21
New Jersey	12	1	45	16	0	0	11	10
Pennsylvania	31	11	149	142	0	0	41	32
East North Central States:								
Ohio	40	40	238	118	1	2	49	41
Indiana	8	3	85	38	2	1	2	11
Illinois	72	70	161	122	1	7	29	32
Michigan	44	15	163	114	0	0	11	5
Wisconsin	34	6	44	102	1	1	2	1
West North Central States:								
Minnesota	28	3	24	27	4	0	4	0
Iowa	18	9	66	33	6	3	11	12
Missouri	20	0	146	14	1	1	41	16
North Dakota	0	2	8	17	3	2	1	3
South Dakota	2	2	9	14	0	0	2	1
Nebraska	18	2	11	12	0	0	0	1
Kansas	26	10	61	27	0	0	8	3
South Atlantic States:								
Delaware	0	0	10	4	0	0	2	2
Maryland [2] [3]	7	1	36	29	0	0	14	10
District of Columbia	2	3	4	8	0	0	1	0
Virginia	1	3	23	17	1	0	18	15
West Virginia	2	7	57	46	1	0	14	15
North Carolina	2	0	88	57	0	0	22	22
South Carolina [3]	0	0	7	4	0	0	11	16
Georgia [3]	2	8	27	13	2	0	9	36
Florida [3]	0	9	2	4	0	0	4	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 2, 1937, and Oct. 3, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers	
	Week ended Oct 2, 1937	Week ended Oct. 3, 1936	Week ended Oct. 2, 1937	Week ended Oct. 3, 1936	Week ended Oct. 2, 1937	Week ended Oct 3, 1936	Week ended Oct 2, 1937	Week ended Oct. 3, 1936
East South Central States:								
Kentucky	2	3	57	31	3	0	25	19
Tennessee	4	24	41	45	1	1	11	37
Alabama [3]	1	6	23	17	1	0	6	12
Mississippi [2] [3]	8	4	13	7	0	0	19	3
West South Central States:								
Arkansas	12	0	15	2	0	0	18	5
Louisiana [3]	3	1	4	2	0	0	17	17
Oklahoma [4]	21	2	14	8	2	0	12	7
Texas [3]	26	1	50	32	1	0	31	30
Mountain States:								
Montana	3	1	9	46	5	7	6	3
Idaho	1	0	10	33	6	2	4	1
Wyoming	1	2	3	3	0	3	2	2
Colorado	31	8	18	16	1	0	31	4
New Mexico	0	1	10	6	0	0	24	14
Arizona	0	0	2	5	0	0	0	2
Utah [2]	3	1	16	10	0	3	0	0
Pacific States:								
Washington	6	4	18	33	6	0	1	2
Oregon	3	2	10	23	1	0	4	7
California	30	18	119	120	1	0	12	9
Total	603	290	2,125	1,664	51	33	574	484
First 39 weeks of year	7,724	2,828	172,584	185,639	8,284	6,123	11,766	10,825

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Oct 2, 1937, 55 cases, as follows: Maryland, 1; South Carolina, 2; Georgia, 24; Florida, 3; Alabama, 11, Mississippi, 1; Louisiana, 1; Texas, 12.
[4] Figures for 1936 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July 1937										
Wisconsin	2	15	42		130		5	219	11	4
August 1937										
Colorado	4	13	1	1	57	1	70	42	2	20
Hawaii Territory	0	8	640		166		1	4	0	6
Oregon	0	11	42	5	16		6	30	15	23
Puerto Rico	2	41	40	1,282	28	2	0		0	6
Vermont	0				1		13	4	0	5
Washington	2	5	4		123		10	44	15	16
Wisconsin	4	6	74		125		56	124	4	10

July 1937

	Cases
Wisconsin:	
Chicken pox	481
Septic sore throat	15
Undulant fever	6
Whooping cough	906

August 1937

	Cases
Chicken pox:	
Colorado	12
Hawaii Territory	38
Oregon	47
Puerto Rico	6
Vermont	11
Washington	56
Wisconsin	129
Conjunctivitis:	
Hawaii Territory	8
Dysentery:	
Colorado (amoebic)	2
Hawaii Territory (amoebic)	1
Hawaii Territory (bacillary)	1
Oregon (amoebic)	2
Puerto Rico	16
Wisconsin (amoebic)	3
Encephalitis, epidemic or lethargic:	
Hawaii Territory	1
Oregon	1
Washington	2
Wisconsin	1
German measles:	
Oregon	8
Washington	2

August 1937—Continued

	Cases
Hookworm disease:	
Hawaii Territory	3
Impetigo contagiosa:	
Colorado	2
Hawaii Territory	34
Oregon	5
Washington	3
Jaundice, infectious:	
Hawaii Territory	13
Oregon	13
Leprosy:	
Hawaii Territory	1
Puerto Rico	1
Mumps:	
Colorado	8
Hawaii Territory	112
Oregon	21
Puerto Rico	3
Vermont	155
Washington	150
Wisconsin	74
Ophthalmia neonatorum:	
Hawaii Territory	2
Paratyphoid fever:	
Oregon	2
Puerperal septicemia:	
Puerto Rico	3
Washington	2
Rabies in animals:	
Washington	17
Rocky Mountain spotted fever:	
Colorado	1
Oregon	2
Washington	1

August 1937—Continued

	Cases
Scabies:	
Oregon	6
Washington	3
Septic sore throat:	
Colorado	1
Oregon	9
Wisconsin	30
Tetanus:	
Hawaii Territory	3
Puerto Rico	10
Tetanus, infantile:	
Puerto Rico	2
Trachoma:	
Hawaii Territory	1
Tularaemia:	
Wisconsin	1
Typhus fever:	
Hawaii Territory	1
Undulant fever:	
Colorado	1
Oregon	8
Vermont	4
Washington	2
Wisconsin	5
Vincent's infection:	
Oregon	8
Whooping cough:	
Colorado	71
Hawaii Territory	15
Oregon	63
Puerto Rico	45
Vermont	33
Washington	251
Wisconsin	903
Yaws:	
Puerto Rico	1

WEEKLY REPORTS FROM CITIES

City reports for week ended Sept. 25, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	178	85	17	105	316	445	4	344	94	880	--------
Current week [1]	107	53	9	137	346	406	5	302	93	989	--------
Maine:											
Portland	0	------	1	0	1	0	0	1	0	14	27
New Hampshire:											
Concord	0	------	0	0	0	0	0	0	0	0	9
Manchester	0	------	0	0	2	0	0	0	0	0	12
Nashua	0	------	0	0	0	0	0	0	0	0	6
Vermont:											
Barre	0	------	0	0	0	0	0	1	0	0	2
Burlington	0	------	0	0	0	0	0	0	0	1	9
Rutland	0	------	0	0	0	0	0	1	0	0	8
Massachusetts:											
Boston	0	------	0	2	14	21	0	6	2	14	175
Fall River	0	------	0	1	2	1	0	2	0	17	28
Springfield	0	------	0	2	1	2	0	0	0	5	30
Worcester	0	------	0	0	1	2	0	0	0	16	35
Rhode Island:											
Pawtucket	0	------	0	0	0	2	0	0	0	0	10
Providence	0	------	1	1	5	2	0	4	0	33	73
Connecticut:											
Bridgeport	0	1	0	0	2	0	0	0	0	0	24
Hartford	0	------	0	0	3	3	0	1	1	2	44
New Haven	0	2	0	0	1	1	0	0	1	1	40
New York:											
Buffalo	0	------	0	0	3	5	0	11	0	9	126
New York	13	11	1	10	56	21	0	68	16	97	1,280
Rochester	0	2	0	0	4	1	0	1	1	7	52
Syracuse	0	------	0	1	5	1	0	1	0	15	55

[1] Figures for Wilmington, N. C., and Spokane, Wash., estimated; reports not received.

City reports for week ended Sept. 25, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
New Jersey:											
Camden	4	------	0	0	0	2	0	0	3	0	25
Newark	0	------	0	2	1	3	0	5	0	22	79
Trenton	0	------	0	1	3	0	0	1	0	2	33
Pennsylvania:											
Philadelphia	3	1	0	5	20	19	0	13	4	39	422
Pittsburgh	2	------	0	21	14	13	0	10	1	27	203
Reading	0	------	0	0	1	1	0	0	0	1	28
Scranton	0	------	------	0	------	0	0	------	0	2	------
Ohio:											
Cincinnati	2	1	0	0	1	17	0	5	3	22	120
Cleveland	4	7	0	8	5	27	0	10	5	42	183
Columbus	0	------	0	0	1	7	0	2	1	1	80
Toledo	1	1	1	1	3	3	0	3	3	11	67
Indiana:											
Anderson	0	------	1	2	1	5	0	0	0	2	6
Fort Wayne	0	------	0	0	0	3	0	1	0	0	16
Indianapolis	0	------	0	2	5	8	0	3	1	12	100
Muncie	0	------	0	0	0	0	0	0	0	0	24
South Bend	0	------	0	0	0	0	0	0	0	0	9
Terre Haute	0	------	0	0	0	1	0	0	2	0	22
Illinois:											
Alton	1	------	0	0	0	1	0	0	0	0	8
Chicago	17	3	0	15	28	29	0	38	4	54	667
Elgin	0	------	0	0	1	1	0	0	0	0	11
Moline	0	------	0	1	0	0	0	0	0	3	6
Springfield	0	------	0	0	2	3	0	0	0	2	25
Michigan:											
Detroit	5	2	0	7	10	37	0	12	2	82	235
Flint	0	------	0	1	3	10	0	0	0	14	31
Grand Rapids	0	------	0	5	2	7	0	0	0	8	34
Wisconsin:											
Kenosha	0	------	0	1	0	0	0	0	0	0	6
Madison	0	------	0	0	1	1	0	1	0	2	20
Milwaukee	0	------	0	12	5	5	0	2	1	44	114
Racine	0	------	0	0	0	3	0	0	0	2	10
Superior	0	------	0	0	0	0	0	0	0	0	7
Minnesota:											
Duluth	0	------	0	0	0	2	0	1	0	12	18
Minneapolis	1	------	0	1	7	7	2	2	1	15	105
St. Paul	1	------	0	0	6	3	0	2	0	16	62
Iowa:											
Cedar Rapids	0	------	------	0	------	0	0	------	0	2	------
Davenport	0	------	------	0	------	0	0	------	1	0	------
Des Moines	1	------	------	0	------	2	0	------	0	0	33
Sioux City	0	------	------	0	------	6	0	------	0	4	------
Waterloo	0	------	------	0	------	3	0	------	0	0	------
Missouri:											
Kansas City	2	1	1	0	5	3	0	3	0	3	90
St. Joseph	0	------	0	0	1	2	0	2	0	0	35
St. Louis	6	------	0	11	5	40	0	6	5	5	224
North Dakota:											
Fargo	0	------	0	0	2	1	0	0	0	25	7
Grand Forks	0	------	------	0	------	0	0	------	0	0	------
Minot	1	------	0	0	0	0	0	0	0	0	9
South Dakota:											
Aberdeen	0	------	------	1	------	0	0	------	0	5	------
Nebraska:											
Omaha	0	------	1	0	3	1	0	1	0	0	54
Kansas:											
Lawrence	0	------	0	0	0	0	0	0	0	1	5
Topeka	0	------	1	1	2	4	0	0	1	5	26
Wichita	0	------	0	0	4	3	0	1	0	3	30
Delaware:											
Wilmington	0	------	0	0	3	0	0	0	0	4	31
Maryland:											
Baltimore	4	5	1	2	13	4	0	14	4	104	210
Cumberland	0	------	0	1	1	2	0	0	0	0	12
Frederick	0	------	0	0	0	0	0	0	0	0	2
Dist. of Col.:											
Washington	4	------	0	0	7	7	0	5	0	9	158
Virginia:											
Lynchburg	2	------	0	0	1	0	0	0	1	3	11
Norfolk	0	------	0	1	1	0	0	0	0	0	56
Richmond	0	------	0	0	1	3	0	1	1	5	64
Roanoke	2	------	0	0	1	0	0	1	0	2	11

City reports for week ended Sept. 25, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
West Virginia:											
Charleston	1	------	0	0	0	0	0	0	0	0	13
Huntington	3	------	------	1	------	1	0	------	0	0	------
Wheeling	0	------	0	0	0	0	0	0	0	14	18
North Carolina:											
Gastonia	0	------	------	0	------	0	0	------	0	0	------
Raleigh	1	------	0	0	1	0	0	1	0	0	9
Wilmington	------	------	------	------	------	------	------	------	------	------	------
Winston-Salem	2	------	0	0	1	4	0	1	1	3	22
South Carolina:											
Charleston	0	1	0	0	1	0	0	1	8	0	25
Florence	0	------	0	0	0	1	0	0	0	0	5
Greenville	0	------	0	0	1	0	0	0	0	0	13
Georgia:											
Atlanta	4	5	0	0	6	14	0	2	9	10	90
Brunswick	0	------	0	0	0	0	0	0	0	0	5
Savannah	2	------	0	0	1	0	0	2	0	0	25
Florida:											
Miami	0	------	0	7	1	2	0	1	0	1	27
Tampa	0	1	1	0	1	2	0	0	0	1	21
Kentucky:											
Ashland	1	------	------	0	------	1	0	------	10	0	------
Covington	0	------	0	0	0	0	0	1	0	5	9
Lexington	0	------	0	0	1	0	0	2	0	0	19
Louisville	0	3	0	0	4	7	0	4	0	22	56
Tennessee:											
Knoxville	1	------	0	0	1	0	0	0	4	0	19
Memphis	2	------	0	3	3	1	0	2	0	7	56
Nashville	1	------	0	0	1	3	0	2	0	1	42
Alabama:											
Birmingham	3	3	0	0	4	2	0	2	0	1	55
Mobile	0	------	0	0	0	2	0	0	0	0	20
Montgomery	0	------	------	1	------	1	0	------	0	0	------
Arkansas:											
Fort Smith	0	------	------	0	------	2	0	------	2	0	------
Little Rock	0	------	0	0	1	1	0	2	0	0	4
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	0	1	0	10
New Orleans	2	1	0	1	6	1	0	7	3	8	131
Shreveport	0	------	0	0	3	0	0	3	0	0	49
Oklahoma:											
Muskogee	0	------	0	0	0	0	0	0	0	0	------
Oklahoma City	1	------	0	0	1	3	0	1	2	1	34
Tulsa	2	------	------	0	------	2	0	------	0	10	------
Texas:											
Dallas	3	------	0	0	1	4	0	3	0	4	62
Fort Worth	0	------	0	0	3	3	0	2	1	5	40
Galveston	0	------	0	0	1	0	0	1	0	0	14
Houston	1	------	0	0	5	1	0	2	0	0	54
San Antonio	0	------	0	0	5	0	0	5	1	0	60
Montana:											
Billings	0	------	0	0	3	0	0	0	0	0	9
Great Falls	0	------	0	0	1	1	2	0	0	5	5
Helena	0	------	0	0	0	0	0	0	0	0	3
Missoula	0	------	0	0	0	2	1	0	0	0	8
Idaho:											
Boise	0	------	0	0	1	0	0	0	0	0	3
Colorado:											
Colorado Springs	0	------	0	1	2	3	0	0	0	0	9
Denver	5	------	0	6	3	6	0	6	2	2	88
Pueblo	1	------	0	0	1	0	0	0	0	0	10
New Mexico:											
Albuquerque	0	------	0	1	0	0	0	4	0	3	7
Utah:											
Salt Lake City	0	------	0	2	3	4	0	0	0	3	34
Washington:											
Seattle	0	------	1	1	4	0	0	4	2	13	78
Spokane	------	------	------	------	------	------	------	------	------	------	------
Tacoma	0	------	0	0	4	3	0	0	0	6	31
Oregon:											
Portland	0	------	0	1	1	0	0	0	0	0	70
Salem	0	------	------	0	------	3	0	------	0	0	------
California:											
Los Angeles	5	1	0	8	16	9	0	13	2	35	297
Sacramento	1	2	0	1	1	1	0	1	1	18	24
San Francisco	1	3	0	1	5	5	0	4	3	35	176

City reports for week ended Sept. 25, 1937—Continued

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Maine:			
Portland	0	0	4
New Hampshire:			
Nashua	0	0	1
Massachusetts:			
Boston	0	0	13
Springfield	0	0	1
Worcester	0	0	1
Rhode Island:			
Providence	0	0	2
Connecticut:			
Hartford	1	0	6
New Haven	0	0	3
New York:			
Buffalo	1	0	2
New York	1	0	26
Rochester	0	0	1
Syracuse	0	0	1
New Jersey:			
Camden	0	0	2
Pennsylvania:			
Philadelphia	3	0	7
Pittsburgh	0	0	1
Ohio:			
Cincinnati	1	0	1
Cleveland	0	0	6
Columbus	0	0	1
Toledo	0	0	1
Indiana:			
Indianapolis	0	0	2
Illinois:			
Chicago	1	1	30
Springfield	0	0	1
Michigan:			
Detroit	0	0	12
Flint	0	0	1
Grand Rapids	0	0	4
Wisconsin:			
Kenosha	0	0	1
Madison	0	0	2
Milwaukee	0	0	13
Racine	0	1	0
Minnesota:			
Duluth	2	0	0
Minneapolis	0	0	20
St. Paul	0	0	13
Iowa:			
Davenport	0	0	1
Des Moines	0	0	2

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Missouri:			
Kansas City	0	0	5
St. Joseph	0	0	2
St. Louis	0	0	4
South Dakota:			
Aberdeen	0	0	1
Nebraska:			
Omaha	0	0	2
Kansas:			
Topeka	0	0	3
Wichita	0	0	5
Delaware:			
Wilmington	1	0	1
Maryland:			
Baltimore	1	1	5
District of Columbia:			
Washington	0	0	6
Virginia:			
Norfolk	0	0	1
Richmond	1	0	0
West Virginia:			
Wheeling	0	0	1
Georgia:			
Brunswick	0	0	1
Florida			
Miami	1	0	1
Kentucky.			
Ashland	1	0	0
Tennessee:			
Memphis	0	0	1
Alabama:			
Birmingham	1	0	0
Arkansas:			
Little Rock	0	0	1
Louisiana:			
New Orleans	0	0	1
Oklahoma:			
Oklahoma City	0	0	2
Texas.			
Houston	1	0	0
San Antonio	0	0	1
Colorado:			
Colorado Springs	0	0	10
Pueblo	0	0	2
Utah:			
Salt Lake City	0	0	1
Oregon:			
Portland	0	0	1
California:			
Los Angeles	1	0	6
Sacramento	0	0	2
San Francisco	0	0	2

Encephalitis, epidemic or lethargic.—Cases: Bridgeport, 1; New York, 4; Toledo, 1; Alton, 1; Sioux City, 2; St. Louis, 65; Norfolk, 1; New Orleans, 1.

Pellagra.—Cases: Newark, 1; Atlanta, 3

Typhus fever.—Cases: New York, 1; Atlanta, 4; Savannah, 3; Tampa, 1; San Antonio, 1.

FOREIGN AND INSULAR

CZECHOSLOVAKIA

Communicable diseases—July 1937.—During the month of July 1937, certain communicable diseases were reported in Czechoslovakia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	10	1	Paratyphoid fever	27	2
Cerebrospinal meningitis	11	4	Poliomyelitis	23	2
Chicken pox	81		Puerperal fever	29	6
Diphtheria	1,683	88	Scarlet fever	1,558	18
Dysentery	428	42	Trachoma	97	
Influenza	31	1	Tularaemia	1	
Lethargic encephalitis	1	1	Typhoid fever	731	34
Malaria	732	1			

FINLAND

Communicable diseases—August 1937.—During the month of August 1937, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	275	Poliomyelitis	39
Dysentery	17	Scarlet fever	369
Influenza	581	Typhoid fever	40
Paratyphoid fever	135		

ITALY

Communicable diseases—4 weeks ended July 18, 1937.—During the 4 weeks ended July 18, 1937, cases of certain communicable diseases were reported in Italy as follows:

Disease	June 21-27		June 28-July 4		July 5-11		July 12-18	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	21	20	35	28	28	24	37	33
Cerebrospinal meningitis	20	17	16	16	15	14	16	16
Chicken pox	230	117	148	88	154	97	125	86
Diphtheria	335	173	332	176	321	185	371	211
Dysentery	41	19	48	27	102	27	121	33
Hookworm disease	10	6	18	10	13	10	24	13
Lethargic encephalitis	2	2	2	2			1	1
Measles	1,298	299	1,089	289	964	281	889	303
Mumps	265	99	189	85	223	77	192	85
Paratyphoid fever	90	70	125	77	179	105	208	128
Poliomyelitis	82	50	65	46	82	58	123	90
Puerperal fever	23	22	27	24	34	31	83	31
Scarlet fever	220	99	187	100	196	98	199	94
Typhoid fever	483	259	664	348	822	399	962	503
Undulant fever	151	101	119	84	101	80	109	81
Whooping cough	606	211	709	213	796	246	702	244

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for September 24, 1937, pages 1354–1368. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued October 29, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

China.—Cholera has been reported in China as follows: Dairen, Manchuria, September 29, 1937, 1 case, 1 death; week ended September 25, Hong Kong, 66 cases, 36 deaths, Macao, 16 cases, Shanghai, 655 cases.

Dutch East Indies—Celebes.—During the week ended September 25, 1937, 6 fatal cases of cholera were reported in Celebes, Dutch East Indies.

French Indochina.—During the week ended September 25, 1937, 56 cases of cholera were reported in Haiphong and 320 cases in Tonkin Province, French Indochina.

Japan—Amagasaki.—During the week ended October 2, 1937, 1 case of cholera was reported in Amagasaki, Japan.

Plague

Argentina—Cordoba Province.—During the period September 1 to 15, 1937, 1 case of plague was reported near Cordoba, Cordoba Province, Argentina.

Hawaii—Island of Hawaii—Hamakua District—Hamakua Mill Company Sector.—One rat found on September 21, 1937, in Hamakua Mill Company Sector, Hamakua District, Island of Hawaii, was reported to be plague infected.

Peru.—During the month of August 1937 plague was reported in Peru as follows: Lambayeque Department, 2 cases, 1 death; Libertad Department, 1 case, 1 death.

Smallpox

Panama Canal Zone—Colon.—During the week ended October 2, 1937, 2 cases of smallpox (alastrim) were reported in Colon, Panama Canal Zone.

Yellow Fever

Brazil—Para State.—On August 20, 1937, 1 death from yellow fever was reported in S. Domingos do Capim, Para State, Brazil.

Colombia.—Yellow fever has been reported in Colombia as follows: Cundinamarca Department, Medina, 1 death on August 6, 1937; Yacopi, 1 death on August 12; Santander Department, Rionegro, 1 death on August 2 and 1 death on August 5.

Senegal—Gossas.—During the week ended September 25, 1937, 1 case of yellow fever was reported in Gossas, Senegal.

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UNITED STATES TREASURY DEPARTMENT

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THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen ROBERT OLESEN, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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MORTALITY FROM CERTAIN CAUSES DURING THE FIRST SIX MONTHS OF 1937[1]

The mortality rates presented in the accompanying table are based upon preliminary reports from the State departments of health of 39 States, the District of Columbia, and Hawaii. For 20 States and the District of Columbia comparative data are shown for the 3 immediately preceding years, 1934–36.

Because of lack of uniformity in the method of classifying deaths according to cause, and because a number of death certificates were not filed in time to be included, these mortality rates are preliminary and are intended to serve as an index of current mortality conditions only within the same area for which previous reports are available. The mortality rates of one State are not strictly comparable with those of another, owing to the varying practices in tabulation procedure in the different States and to the fact that crude rates are affected by differences in the age, sex, and racial characteristics of the populations concerned.

After an unfavorable start in the first quarter, due to the influenza epidemic during the first part of the year, mortality from all causes during the second quarter was lower than in the corresponding period of any of the 3 preceding years. As a result, mortality during the first half of 1937, 11.8 per 1,000 population, was slightly less than that for the corresponding period of last year and only about 2.5 percent greater than that of 1934 and 1935. This improvement in mortality conditions was widespread, especially in comparison with 1936; only 7 of the 26 States for which comparative data are available reported a higher death rate in the first 6 months of 1937 than in the corresponding period of 1936. All of the important causes of death except cancer shared in the decrease, although for some causes the death rate was still higher than in 1934 and 1935.

Especially noteworthy is the continued decrease in the number of maternal deaths. The rate per 1,000 live births was 4.8, about 13 percent less than the corresponding figure for last year.

The record of the communicable diseases was also favorable. Only for whooping cough was a higher rate reported than for last year, and even this rate was well below the corresponding rate for 1934 and 1935.

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[1] From the Division of Public Health Methods, National Institute of Health.

The slight increase in the death rate from tuberculosis which was reported for the first quarter was replaced by a marked decrease during the second quarter so that the rate for the first 6 months is lower than for the corresponding period in any of the 3 preceding years.

Neither the birth rate nor the infant mortality rate showed any change as compared with 1936.

Altogether the record for the first 6 months has been very favorable in spite of the influenza outbreak during the first few weeks of the year.

Mortality from certain causes in the first 6 months of 1937, with comparative data for the corresponding period in preceding years

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Acute poliomyelitis and polioencephalitis (16)	Encephalitis, epidemic or lethargic (17)	Epidemic cerebrospinal meningitis (18)	Tuberculosis, all forms (23-32)	Cancer, all forms (45-53)	Diabetes (59)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the heart (90-95)	Pneumonia, all forms (107-109)	Diseases of the digestive system (115-129)	Diarrhea and enteritis under 2 years (119)	Nephritis (130-132)	All accidents (176-195, 201-214) [1]	Automobile accidents (206, 208, 210) [1]
21 STATES [2]																								
January-June:																								
1937	11.8	15.5	55	4.8	0.7	0.9	2.3	3.0	1.4	42.3	0.2	0.6	2.1	53.6	117.2	27.9	85.9	294.0	108.9	61.8	5.4	84.5	70.4	23.6
1936	12.0	15.5	55	5.5	.9	1.0	3.0	2.0	1.7	29.7	.2	.6	3.3	53.8	115.5	28.1	92.7	295.7	115.5	62.7	5.3	88.3	------	------
1935	11.5	15.6	58	5.7	1.0	5.4	3.1	4.4	1.9	28.8	.2	.7	2.6	54.9	113.3	25.4	86.9	270.0	105.1	64.8	5.9	85.8	------	------
1934	11.5	15.3	61	6.1	1.3	6.4	2.9	4.6	2.0	19.8	.3	.6	1.0	56.0	110.9	26.0	82.2	267.6	101.7	66.4	7.0	90.6	------	------
January-March:																								
1937	12.8	15.2	61	5.2	.6	.7	2.8	3.1	1.8	67.3	.2	.7	2.4	54.2	117.2	30.9	91.1	316.6	144.4	60.2	4.2	88.0	67.9	23.1
1936	12.6	15.5	58	5.8	.9	.9	3.4	2.0	2.2	36.0	.2	.6	3.5	53.8	114.9	30.5	98.0	313.9	143.6	61.6	4.9	92.8	------	------
1935	12.0	15.5	63	6.0	.9	4.9	3.2	3.9	2.4	43.7	.2	.6	2.4	54.8	110.6	27.3	90.1	282.5	123.9	62.7	4.2	88.4	------	------
1934	12.0	15.0	64	6.1	.9	5.5	3.3	4.0	2.5	27.4	.3	.6	1.0	55.2	108.6	27.4	85.4	282.8	122.2	63.3	5.8	94.0	------	------
April-June:																								
1937	10.8	15.8	49	4.4	.8	1.2	1.8	2.8	1.0	17.5	.2	.6	1.7	52.9	117.2	25.0	80.7	271.6	73.7	63.4	6.6	81.0	73.0	24.1
1936	11.3	15.4	52	5.3	1.0	1.1	2.6	1.9	1.2	23.2	.1	.6	3.0	53.9	116.0	25.6	87.2	277.6	87.2	63.7	5.6	83.9	------	------
1935	10.9	15.8	53	5.4	1.2	6.0	3.0	4.9	1.4	14.1	.2	.8	2.9	55.0	116.0	23.6	83.7	257.6	83.6	66.7	7.6	83.3	------	------
1934	11.1	15.6	59	6.2	1.7	7.2	2.4	5.2	1.4	12.3	.4	.6	1.0	56.8	113.1	24.6	79.1	252.4	81.4	69.5	8.3	87.4	------	------
JANUARY TO JUNE																								
Alabama:																								
1937	11.4	20.8	71	6.6	1.2	.1	.3	6.6	2.4	82.8	.6	.3	5.2	65.2	57.2	11.0	68.6	165.0	117.1	57.0	13.1	79.5	70.3	20.
1936	11.6	21.3	71	6.5	.8	1.2	.5	2.6	2.7	82.2	.4	.1	1.1	68.2	56.1	12.6	69.3	152.2	139.1	59.7	13.2	82.4	------	------
Colorado, 1937	14.3	17.9	73	5.8	1.3	.2	2.3	6.2	2.4	86.1	1.9	1.3	3.8	73.3	122.5	17.5	92.9	242.2	245.0	81.2	4.9	86.1	87.4	27.9
Connecticut:																								
1937	10.9	12.6	45	3.3	.3	1.3	1.2	1.7	.9	20.0	(3)	.5	.9	38.8	125.6	34.8	86.0	246.1	89.9	49.9	3.6	87.6	64.4	21.8
1936	10.9	12.5	47	4.9	.1	.7	.8	2.1	.2	13.4	.1	.3	1.3	40.6	128.7	32.0	(4)	247.1	99.6	(4)	2.9	96.4	------	------
1935	11.0	12.6	47	5.6	.7	3.4	2.0	1.3	.9	12.3	.2	.5	1.1	47.3	124.3	34.8	(4)	243.6	90.3	(4)	1.5	93.0	------	------

[1] Data not compiled for these reports prior to 1937.

[2] States included are Connecticut, District of Columbia, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Louisiana, Maryland, Michigan, Minnesota, Montana, New Jersey, New York, Pennsylvania, Rhode Island, Tennessee, Virginia, West Virginia, and Wisconsin (estimated population as of July 1, 1937, 72,178,000). List includes all of the States with available data for the 4 years covered in this summary.

[3] No deaths.

[4] Data not available.

Mortality from certain causes in the first 6 months of 1937, with comparative data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Acute poliomyelitis and polioencephalitis (16)	Encephalitis, epidemic or lethargic (17)	Epidemic cerebrospinal meningitis (18)	Tuberculosis, all forms (23-32)	Cancer, all forms (45-53)	Diabetes (59)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the heart (90-95)	Pneumonia, all forms (107-109)	Diseases of the digestive system (115-129)	Diarrhea and enteritis under 2 years (119)	Nephritis (130-132)	All accidents (176-195, 201-214)	Automobile accidents (206, 208, 210)
JANUARY TO JUNE—contd.																								
Delaware:																								
1937	14.3	15.8	67	3.9	1.5	2.3	(3)	7.7	.8	36.2	(3)	(3)	3.1	55.4	108.5	30.8	103.1	384.1	129.3	66.2	6.9	143.9	106.2	30.2
District of Columbia:																								
1937	14.8	18.5	65	6.8	.9	3.8	.9	4.4	3.1	27.9	(3)	.9	7.5	99.3	140.6	31.3	101.4	337.2	161.9	75.2	5.6	96.1	78.9	26.0
1936	15.8	18.4	72	5.6	1.9	2.3	.6	5.5	6.5	13.0	.3	.6	14.6	114.4	132.5	33.5	111.1	370.7	177.4	77.6	5.8	102.7	------	------
1935	15.3	18.0	62	4.9	1.4	(3)	2.7	.3	3.7	18.0	(3)	1.4	20.0	113.7	129.0	28.5	101.2	359.2	171.4	91.0	9.2	106.6	------	------
Florida:																								
1937	13.1	15.9	64	7.4	3.4	.4	.1	3.3	2.4	54.2	.2	.4	6.6	59.4	96.7	20.4	108.1	253.6	81.1	94.5	13.4	103.4	107.5	41.4
1936	13.3	15.1	69	9.1	2.4	.4	.1	1.7	2.8	79.4	.7	.5	3.3	54.1	87.9	21.7	106.9	257.6	105.3	83.5	8.2	110.1	------	------
1935	12.6	15.1	69	9.1	2.2	3.4	(3)	3.9	3.9	58.7	.6	(3)	.6	56.7	85.3	22.4	97.6	228.3	80.7	93.3	16.1	110.2	------	------
Georgia:																								
1937	10.9	18.7	66	7.7	2.0	.1	.3	3.4	2.0	70.0	.6	2	1.7	49.9	54.1	11.3	84.7	167.5	107.8	63.4	12.9	104.2	67.9	25.7
1936	11.8	18.5	70	7.5	3.0	.3	.3	2.0	2.4	96.5	.3	.4	3.0	55.4	53.2	11.2	80.1	176.5	151.4	61.3	9.7	103.5	------	------
1935	10.9	18.7	75	8.0	3.6	1.4	.7	6.7	2.9	66.8	.7	.1	.9	56.0	50.9	11.9	72.2	156.8	114.0	74.2	15.8	102.7	------	------
Hawaii: [5]																								
1937	9.1	20.3	81	5.8	2.2	(4)	(3)	.5	3.8	8.1	(3)	(3)	1.1	77.7	71.2	16.7	43.5	118.2	100.9	71.7	21.6	72.8	51.8	16.7
1936	8.0	20.3	73	5.2	2.8	(3)	(3)	1.1	2.2	16.0	(3)	.6	3.3	74.9	57.3	14.3	43.5	133.3	74.4	82.7	19.3	73.3	------	------
1935	8.1	22.3	68	5.6	1.7	(3)	(3)	4.0	(3)	7.9	(3)	(3)	1.7	77.7	61.3	14.8	44.2	115.2	76.0	63.6	22.1	73.8	------	------
Idaho:																								
1937	10.5	20.6	46	3.5	1.2	5.2	2.0	2.4	.4	67.9	(3)	1.2	1.2	22.1	78.7	10.8	74.3	171.1	95.2	68.7	4.0	34.9	86.4	30.1
1936	10.9	20.2	47	3.5	1.2	2.5	15.3	1.7	.8	21.1	.4	.8	9.1	29.0	77.5	17.0	76.3	193.6	130.2	56.4	.4	28.6	------	------
1935	10.2	20.1	61	7.3	1.3	2.5	4.6	10.1	.4	23.6	.4	2.9	5.1	25.7	66.9	13.5	68.2	162.5	115.8	60.6	.8	29.0	------	------
Illinois:																								
1937	11.9	13.3	50	4.5	.2	.2	3.2	2.1	2.2	30.2	.2	.3	1.8	53.6	128.5	28.4	75.7	309.5	92.9	69.2	3.1	103.8	76.0	30.0
1936	12.2	13.3	51	4.6	.5	.2	4.9	2.3	2.8	19.7	.1	.4	3.0	54.0	131.2	30.9	84.4	331.0	100.5	67.7	3.8	109.2	------	------
1935	11.5	13.2	54	5.5	.7	7.3	7.8	3.4	2.8	24.9	.2	.6	3.7	54.8	126.7	25.5	75.3	288.6	98.2	69.7	3.6	101.6	------	------
Indiana:																								
1937	12.0	13.7	57	4.1	.4	.6	4.4	4.6	1.3	54.6	.3	.5	2.2	49.0	104.3	16.1	123.3	263.2	123.6	(4)	4.7	68.3	76.6	34.4
1936	12.4	13.8	55	5.4	.8	.2	4.5	1.7	3.7	42.8	.1	.7	2.7	49.9	108.7	18.1	135.9	280.5	122.1	(4)	3.7	83.8	82.7	29.4
1935	11.5	13.6	59	5.8	.5	4.8	4.2	5.5	2.6	37.1	.1	.6	3.7	50.0	110.5	14.7	129.3	269.8	108.0	(4)	3.1	68.7	69.9	29.1

Iowa:																							
1937	10.1	14.8	46	5.2	.4	.1	5.8	2.2	.2	56.3	.3	.9	1.1	21.2	110.1	21.6	105.9	225.8	84.1	51.5	2.9	62.7	45.8	17.2
1936	10.5	16.5	44	4.6	1.1	.2	4.6	1.6	1.1	26.6	(3)	.3	2.7	23.9	125.4	27.4	110.6	251.4	91.3	55.5	2.8	66.2		
1935	10.7	14.6	55	5.4	.8	11.9	3.0	1.6	1.9	32.5	.4	.8	2.1	27.7	126.2	23.5	107.0	238.3	98.1	55.9	3.0	64.1		
Kansas:																							
1937	11.0	13.9	49	4.7	(3)	.1	6.2	1.7	1.5	57.1	.3	1.2	1.7	28.1	113.0	24.2	104.2	247.8	84.8	58.8	3.5	90.7	98.5	23.1
1936	12.4	14.8	56	6.9	1.2	.2	6.6	1.4	2.6	75.7	.3	1.2	1.8	32.9	112.3	23.2	113.4	259.3	119.0	67.0	4.0	107.2		
1935	11.5	15.7	56	5.5	.4	22.8	2.6	3.5	2.0	50.6	.2	1.5	2.9	29.8	110.3	22.1	98.7	235.4	115.5	68.5	4.7	92.4		
Kentucky:																							
1937	10.6	19.2	49	4.3	2.5	3.9	1.6	5.9	3.8	81.1	.6	.6	3.7	67.8	65.1	11.5	86.8	176.4	116.1	54.4	9.0	64.6	68.1	22.6
Louisiana:																							
1937	12.4	18.8	77	8.6	4.4	1.5	.7	8.3	3.5	89.5	.1	.4	1.9	75.3	77.3	18.1	70.6	214.2	129.6	73.2	16.0	109.4	66.5	19.3
1936	12.7	17.1	87	11.2	4.5	3.8	.3	5.8	3.7	77.8	.4	.2	2.4	74.6	77.9	18.0	74.8	275.2	150.8	76.4	17.8	111.6		
1935	11.2	17.0	77	7.7	7.4	10.2	.7	3.2	4.7	34.1	.7	.6	1.0	78.8	75.3	15.1	69.2	181.2	97.5	82.2	16.3	106.7		
Maine:																							
1937	14.1	18.6	60	5.2	.9	.2	.7	1.9	.5	65.3	.5	.2	.9	34.4	144.7	23.7	124.6	392.8	126.0	57.6	5.4	95.3	59.7	13.4
Maryland:																							
1937	14.0	16.1	65	3.8	.6	4.2	1.1	6.1	1.8	27.4	.4	1.9	3.7	88.5	131.6	27.1	117.6	332.1	144.0	62.7	7.4	152.3	86.6	29.1
1936	13.9	16.2	63	4.8	1.0	2.4	1.0	4.0	1.8	15.4	(3)	1.0	11.8	82.7	129.3	29.8	119.2	326.3	143.5	58.0	4.2	155.4		
1935	13.6	16.4	64	5.4	1.1	2.2	2.7	3.9	1.2	25.1	(3)	1.1	5.0	86.9	130.0	27.7	119.1	298.9	139.1	67.5	8.0	142.3		
Michigan:																							
1937	11.4	18.0	55	3.8	.4	.2	4.5	2.7	1.0	31.4	(3)	.3	1.1	46.9	115.4	26.9	91.1	291.0	112.6	64.1	3.9	66.1	80.0	33.4
1936	11.8	18.1	54	5.2	.6	.3	3.1	2.4	.7	17.7	.3	.6	1.6	43.9	113.4	27.7	98.7	297.0	115.2	70.6	6.3	70.1		
1935	11.5	18.3	56	5.4	.5	7.4	3.2	3.0	.9	23.6	(3)	.3	1.1	46.5	111.8	27.1	93.9	276.5	107.7	69.3	4.3	67.6		
Minnesota:																							
1937	10.7	18.4	45	3.4	.3	.2	2.4	2.1	.4	43.3	(3)	.9	1.5	37.2	141.7	24.8	91.9	242.2	98.6	55.5	2.1	48.6	66.2	17.2
1936	10.8	16.9	45	4.7	.5	1.6	7.4	1.0	.3	18.1	.2	.6	2.6	37.7	129.0	27.3	84.6	250.7	100.7	60.7	4.0	49.8		
1935	10.4	16.5	50	5.6	.2	4.1	4.8	3.4	.5	24.3	.1	1.0	2.1	36.8	130.2	23.5	85.6	219.2	97.8	64.9	3.1	50.1		
Missouri:																							
1937	12.9	13.0	68	6.5	2.7	.1	4.1	3.0	2.4	62.9	.4	.8	1.8	60.3	122.4	25.0	99.4	281.4	165.2	58.1	5.2	109.4	80.0	27.2
Montana:																							
1937	12.8	19.4	57	4.3	2.7	.4	3.8	1.1	2.3	102.2	(3)	.8	2.3	44.0	107.8	20.1	98.4	230.5	145.1	68.7	1.1	71.4	92.7	20.5
1936	12.1	19.2	51	5.3	1.1	.4	12.1	4.2	3.0	29.9	(3)	(3)	4.2	44.7	100.0	24.2	91.3	198.4	149.2	81.8	6.4	76.5		
1935	12.2	18.4	63	5.2	1.9	17.5	3.0	6.1	3.4	60.0	.4	1.1	3.0	46.0	101.8	18.6	84.7	211.2	156.8	105.6	6.5	80.1		
Nebraska:																							
1937	10.5	15.7	51	5.2	.4	.4	4.9	2.4	1.2	76.0	.6	.3	1.6	23.7	107.3	28.5	87.7	236.8	83.5	61.2	3.1	67.1	58.2	20.1
1936	10.6	16.4	46	6.8	.7	1.5	8.4	1.8	1.6	27.1	.3	.6	1.8	19.0	112.2	27.7	94.7	247.1	89.0	81.4	3.4	77.5		
1935	10.3	16.3	48	5.8	.6	11.5	3.5	1.2	1.5	35.9	.3	.6	4.3	22.8	102.5	20.6	105.9	198.8	114.4	68.3	3.0	50.6		
Nevada:																							
1937	13.2	13.6	60	10.3	(3)	(3)	4.0	4.0	(3)	16.0	(3)	(3)	(3)	71.9	73.9	10.0	83.8	257.6	173.7	37.9	4.0	45.9	135.8	39.9
New Jersey:																							
1937	10.8	12.2	44	3.7	.5	2.2	.6	1.4	.7	16.7	.1	.7	1.7	50.2	121.5	32.6	79.1	329.8	91.6	57.1	2.6	73.6	73.6	24.0
1936	10.7	12.2	49	4.1	.5	.4	1.0	1.3	.5	11.3	.3	.8	2.4	51.6	122.5	32.3	85.0	315.6	88.7	56.0	3.3	82.4		
1935	10.6	12.6	51	4.8	.5	2.4	1.1	2.8	1.2	14.7	.3	.6	.8	52.2	118.8	29.9	80.4	302.0	80.8	55.9	3.3	86.1		
New York:																							
1937	12.8	14.5	49	4.1	.3	.6	1.2	1.2	.9	17.1	(6)	.7	1.5	62.1	150.3	40.0	73.0	389.1	119.7	70.4	6.1	82.7	67.9	19.7
1936	12.7	14.0	50	5.6	.6	1.8	2.3	1.0	.4	9.5	(3)	.7	3.0	61.5	146.1	38.1	85.0	375.8	117.9	69.9	5.2	84.9		
1935	12.4	14.4	54	5.7	.4	2.5	2.3	3.0	1.0	10.6	.2	.6	2.7	61.4	143.9	35.1	80.5	344.3	110.8	69.6	6.7	88.1		

[3] No deaths.
[4] Data not available.
[5] January to May.
[6] Less than 1/16 of 1 per 100,000 population.

Mortality from certain causes in the first 6 months of 1937, with comparative data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births: Total infant mortality	Rate per 1,000 live births: Maternal mortality	Death rate per 100,000 population (annual basis): Typhoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Acute poliomyelitis and polioencephalitis (16)	Encephalitis, epidemic or lethargic (17)	Epidemic cerebrospinal meningitis (18)	Tuberculosis, all forms (23–32)	Cancer, all forms (45–53)	Diabetes (59)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the heart (90–95)	Pneumonia, all forms (107–109)	Diseases of the digestive system (115–129)	Diarrhea and enteritis under 2 years (119)	Nephritis (130–132)	All accidents (176–195, 201–214)	Automobile accidents (206, 208, 210)
JANUARY TO JUNE—con.																								
North Carolina:																								
1937	10.1	23.0	65	6.0	1.4	1.3	.4	3.6	3.0	42.5	.3	.6	1.4	60.7	52.5	11.0	82.0	165.4	107.6	60.2	16.4	89.9	67.6	24.9
1936	11.0	22.7	65	6.7	1.0	.2	.7	.9	3.0	53.2	.4	.6	1.9	62.0	52.5	12.6	(4)	(4)	142.7	(4)	9.8	(4)	------	------
1935	10.6	23.2	72	6.9	1.1	3.9	.6	12.4	3.1	48.3	1.4	.4	1.1	60.8	50.0	10.4	(4)	(4)	118.3	(4)	16.4	(4)	------	------
North Dakota:																								
1937	8.6	18.8	56	5.3	(3)	(3)	1.7	.3	1.1	47.4	(3)	.3	2.9	26.8	78.5	19.1	77.7	172.5	87.7	53.7	9.7	37.4	50.6	11.7
Oklahoma:																								
1937	9.2	14.2	66	6.4	2.2	1.7	1.7	1.7	2.0	71.0	1.1	.2	3.4	56.1	74.0	13.3	62.2	141.3	103.8	55.8	4.0	68.9	60.5	22.9
Oregon:																								
1937	13.2	15.1	46	4.3	.6	.2	1.4	2.4	.2	54.6	.6	1.0	.8	88.1	122.4	24.0	112.0	303.1	89.8	57.2	.6	115.8	88.6	29.1
Pennsylvania:																								
1937	12.1	15.6	55	4.7	.6	1.0	2.2	2.8	1.1	44.8	.1	.8	1.9	49.8	115.2	33.4	82.7	323.3	101.8	54.3	4.2	92.1	61.0	19.9
1936	11.8	15.7	52	4.7	.5	.5	2.2	1.2	1.5	20.8	.1	.5	1.8	46.6	111.5	31.0	92.2	316.7	103.0	54.7	5.5	90.4	------	------
1935	11.4	16.0	58	5.4	.6	4.2	2.7	2.4	1.7	28.3	.2	.9	1.4	48.2	106.9	28.7	86.0	291.8	105.8	55.1	5.1	90.9	------	------
Rhode Island:																								
1937	13.4	15.2	52	4.1	.3	.9	2.1	2.4	.6	20.7	(3)	.6	3.8	53.3	162.0	45.9	104.5	395.9	130.6	57.2	4.4	123.8	49.2	15.1
1936	12.6	14.9	52	4.5	(3)	.6	2.7	.9	.3	15.1	(3)	.6	5.0	50.8	135.0	36.9	102.5	362.9	123.5	62.3	4.4	107.2	------	------
1935	12.4	15.4	55	2.9	.3	1.8	.6	1.5	.6	13.0	.3	.3	4.1	55.1	144.5	38.8	101.9	367.2	103.6	68.4	6.2	106.3	------	------
South Carolina:																								
1937	10.6	18.4	91	8.4	4.3	1.0	.4	3.0	2.5	65.1	.6	.3	1.1	47.2	48.4	11.2	89.5	178.2	109.1	26.5	6.9	85.8	43.1	24.7
1936	10.8	18.7	85	8.9	3.2	.6	.5	3.6	2.2	76.5	.9	.2	4.1	51.9	43.0	10.0	94.6	178.8	137.2	26.2	4.1	88.0	------	------
1935	11.5	17.8	94	10.1	3.7	2.0	(3)	10.4	2.4	113.3	.4	1.8	2.4	50.9	37.9	11.7	92.6	183.4	129.4	19.2	4.4	91.9	------	------
South Dakota:[7]																								
1937	10.8	16.8	62	5.7	.4	(3)	5.7	1.3	.4	100.2	(3)	.4	2.2	36.0	80.0	25.9	76.9	180.2	116.5	46.2	2.2	54.9	44.0	10.5
1936	9.4	18.7	49	5.8	1.3	.4	5.7	.9	.9	28.8	(3)	.4	(3)	39.3	88.3	21.4	82.2	172.2	97.5	55.1	5.7	74.0	------	------
1935	10.3	19.0	64	7.9	.4	10.5	2.6	4.0	1.3	62.8	1.8	(3)	.4	40.9	96.3	18.9	80.4	140.2	152.0	56.3	6.2	62.4	------	------
Tennessee:																								
1937	10.6	15.4	67	8.3	2.1	1.1	.8	3.9	3.3	76.2	.5	.6	3.3	86.5	65.2	11.2	79.1	159.7	119.8	62.5	10.3	65.2	63.4	21.3
1936	11.6	15.9	68	7.4	1.8	1.2	1.1	2.6	2.9	87.3	.3	1.0	5.4	91.6	61.3	13.5	81.5	167.5	159.3	62.4	7.5	67.8	------	------
1935	10.3	16.4	69	7.7	2.6	2.2	.5	21.8	3.7	59.6	.6	.6	4.7	87.0	63.0	11.5	77.5	130.0	115.6	64.4	11.4	60.7	------	------

Utah:																							
1937	10.2	23.6	42	3.6	.8	1.2	2.0	3.1	1.2	38.6	.4	1.2	2.0	23.8	90.9	23.8	62.4	262.0	75.7	71.8	2.3	88.1	76.8	29.3
Vermont:																							
1937	12.0	13.1	57	12.0	1.0	(3)	(3)	1.0	1.0	53.7	(3)	(3)	.5	46.9	135.8	22.6	104.2	321.7	126.4	53.2	3.7	74.8	59.5	15.8
Virginia:																							
1937	11.4	18.2	69	5.4	1.0	3.7	.4	7.8	2.0	65.6	.6	.7	6.2	65.9	71.9	16.9	92.4	233.2	132.5	43.9	7.2	86.5	61.5	22.6
1936	12.1	19.1	64	5.5	1.5	1.4	.6	3.8	3.0	58.3	.3	.4	7.5	70.2	70.8	17.4	101.6	244.1	123.1	46.8	3.7	98.9	------	------
1935	11.7	19.0	71	5.8	1.1	9.7	1.1	11.1	3.2	58.5	.4	.5	4.9	74.3	70.5	16.1	98.0	229.6	104.8	50.9	7.2	90.2	------	------
Washington:																							
1937	12.1	14.0	44	5.1	.7	1.3	1.6	.8	1.1	42.3	.1	2.4	1.3	46.1	129.7	23.5	108.2	305.8	88.8	54.9	1.2	80.0	87.6	26.7
1936	12.2	13.8	46	4.6	.4	3.7	2.4	.9	.2	39.3	.6	2.3	1.8	52.4	128.7	26.2	110.1	291.1	90.5	65.9	1.2	80.7	91.4	31.7
1935	11.6	13.9	45	5.9	.4	2.1	1.7	2.7	1.1	23.8	.9	2.0	2.5	52.1	132.5	24.1	101.4	281.4	61.4	66.6	2.2	83.8	------	------
West Virginia:																							
1937	10.7	20.4	64	6.4	1.6	1.5	2.1	10.4	3.2	70.2	.8	.1	6.2	56.6	67.7	15.8	73.8	176.3	124.2	55.6	8.0	66.7	94.5	20.3
1936	10.8	19.1	64	7.2	1.8	2.2	1.8	3.5	5.2	45.0	.8	.5	7.0	56.7	67.4	15.2	81.4	185.6	127.6	52.7	4.5	75.1	------	------
1935	10.1	20.7	65	6.4	3.1	11.8	4.9	11.1	5.8	44.0	.3	.6	4.3	61.3	70.6	12.0	71.4	144.0	107.9	58.7	5.9	69.8	------	------
Wisconsin:																							
1937	12.0	17.4	49	3.9	.3	.1	3.5	1.0	.6	74.9	.1	.4	1.0	37.1	137.5	28.4	97.9	312.2	90.8	(4)	4.2	75.2	75.4	24.3
1936	11.5	17.1	51	4.5	.5	.5	6.8	1.9	.4	19.5	(3)	.6	1.5	37.0	133.9	28.8	103.8	297.6	90.8	(4)	4.6	73.1	------	------
1935	10.8	17.2	54	4.1	.1	4.0	5.4	1.6	.5	30.7	.1	1.1	1.7	38.7	128.1	25.7	91.7	265.3	80.4	(4)	4.9	73.6	------	------
Wyoming:																							
1937	11.6	18.3	54	5.1	.9	.9	6.9	3.4	(3)	81.9	.9	1.7	3.4	15.5	74.1	8.6	84.4	271.5	150.0	77.6	11.2	35.3	106.0	40.5

[3] No deaths.
[4] Data not available.
[7] January to April.

STUDIES ON OXYURIASIS

VI. THE INCIDENCE OF OXYURIASIS IN 1,272 PERSONS IN WASHINGTON, D. C., WITH NOTES ON DIAGNOSIS

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In a series of investigations of oxyuriasis, initiated in the spring of 1936 as a group research project in the Division of Zoology, one of the first phases to receive consideration has been the incidence of this parasitic infestation in residents in or near Washington, D. C. The present report is based on the examination of 1,272 persons, including children and adults, males and females, and members of the white and of the Negro race, the latter being referred to throughout the paper as "colored." Approximately half of these persons (628) were from the general population, widely scattered as to place of residence, representing for the most part a low social-economic level, but also including persons of the middle and a few persons of the upper social-economic levels. The other half (644) of the total number consisted of institutionalized boys and girls, between the ages of 11 and 20, at the National Training School for Boys (617 individuals), and the National Training School for Girls (27 individuals); the majority of these represented a low social-economic level, with a few from the middle level.

All examinations here reported were made purely for diagnostic purposes; examinations following any form of treatment, to check its efficacy, were not included, except in a very few cases in which examinations remained consistently positive. An attempt has been made to analyze the data, so that they will not only furnish information as to incidence but will throw light on diagnostic procedures, in order that conclusions may be drawn as to the reliability of results.

METHOD OF EXAMINATION

It is now recognized, by those well informed regarding pinworms, that the usual methods of examination of feces for parasites are unreliable in the diagnosis of *Enterobius vermicularis* infestation. The eggs of the parasite are not deposited in the alimentary canal, as are those of other worm parasites in that location, but are deposited on the skin of the perianal region after the females have wandered out through the anus; eggs will appear in the feces probably only in those few cases in which the eggs were dislodged from the anal region, or in heavy infestations where occasional female worms have passed in feces and the eggs have been released when the worms ruptured or disintegrated.

It seems apparent, therefore, that a diagnostic method should be used which includes a search for the eggs in the location where they are deposited, that is, on the perianal region, by some such technique as will remove them from that region and allow their identification microscopically. However, very little emphasis has been placed on this point and on appropriate procedures. As will be noted later, in a review of previous investigations, the examination of such material has been used in special investigations for the past 60 years, but books on human parasitology or on medical diagnosis for the most part do not specifically recommend these procedures. Even though the authors may point out that the pinworm constitutes a special case, from the diagnostic point of view, they recommend a search for the worms themselves, in feces after a purgative or in enema returns; they are usually silent on the question of search for the eggs. Brumpt (1936) states that if a clinical diagnosis cannot be verified by actually seeing the worms at the anal opening, "On pourra les rechercher dans les matières fécales expulsées spontanément ou après un lavement froid; il est généralement nécessaire de diluer les matières dans l'eau et de décanter. La recherche des oeufs dans les selles est rarement positive et seulement dans le cas où les femelles, évacuées dans le milieu extérieur, ont pondu sur la parcelle prélevée pour l'examen coprologique." In another part of his discussion, Brumpt refers to Netter's use of lard suppositories for the detection of worms; the suppository having been inserted at night, worms present are said to be found attached to it when it is withdrawn in the morning. It is not clear to us how a lard suppository could be withdrawn after this period of time.

Neveu-Lemaire (1936), after stating under a discussion of the biology of the parasite that "Un fait bien connu est la rareté de la constatation des oeufs d'oxyure dans les selles", gives no specific procedure in his section on diagnosis, but simply states: "Le diagnostic de l'oxyurose, étant donnés ses symptômes objectifs trés nets, ne présente en général aucune difficulté."

Langeron (1921, 1933) recommends examination of fecal material obtained directly from the rectum, using an instrument devised by Riff (1916), as noted later in this paper, and urges that material from under the fingernails also be examined microscopically. We have found the latter material very unreliable, for diagnostic purposes, in a small group of individuals known to have pinworms, who were examined by us.

In this country, Stitt (1927) recommends the administration of a diagnostic dose of calomel and salts, and subsequent examination of the stools for the worms. Todd and Sanford (1936) point out that "The worms are not infrequently found in the feces, particularly after a copious enema; the ova, rarely. The latter are best found by

scraping the skin with a dull knife at the margin of the anus." However, they recommend for diagnosis the giving of a purgative or copious enema and searching the stool for the worms.

Chandler (1936) states that "eggs are seldom found in the feces before the worms have disintegrated, but can be obtained from scrapings from about the anus or lower part of the rectum." He gives no more specific directions.

In medical practice it would be possible, of course, in individual suspected cases in which clinical symptoms indicated pinworm infestation, to employ several methods, such as examination of feces, as given above, after enemas, and, in addition, examination of the perianal material for eggs of the parasite. In determining the incidence of pinworm infestation as a public health problem, a complicated technique involving the administration of drugs or of enemas, with collection and examination of feces for worms, is impossible as a diagnostic procedure; here as well as in medical practice a simpler technique, such as the making and examination of anal swabs, has great advantages.

It is surprising how frequently figures are still given for the incidence of pinworms in surveys of parasitic infestations based on ordinary fecal examinations, with no notation of the fact that these figures cannot be relied upon to portray the true state of affairs as regards this parasite. As discussed later, a considerable number of European studies have been made, using the more reliable method of perianal examination for eggs. So far as we know, such a method had not been employed in the United States prior to the present investigations, with the single exception of the critical study made by Headlee (1935).

The method employed in the present investigation consisted of the use of anal swabs; fecal examinations were made in some cases, for supplementary information, and a small series in which swab material was lacking but fecal material available is included for comparative purposes.

Hall (1937) has discussed various types of anal swabs and scrapers and the development of the NIH swab as the most reliable type, from all points of view. This swab consists of a cellophane-tipped glass rod, carried through a rubber cork fitted into a glass tube. Transparent, colorless cellophane is used. The folds of the cellophane provide the proper amount of scraping of the skin when the swab is used, and, in addition, eggs stick to the cellophane. Not only eggs of *Enterobius* but also those of *Trichuris*, *Ascaris*, *Necator*, *Hymenolepis*, and *Taenia* have been found on the swabs. The glass tube prevents loss of material during transportation and ensures the safety of the carrier from infection. The cellophane tip, held to the rod by a narrow rubber band, is easily removed and mounted directly onto a glass

slide for microscopic examination of the material which it has picked up. The arrangement for transporting the NIH swab, that is, a perforated rubber cork in a glass tube, has been used in Europe for an instrument devised for obtaining a sample of rectal contents, this instrument consisting of a glass rod with a depression near its tip. The description and illustration of this instrument, given originally by Riff (1916) and subsequently by Forget-Urion (1918) and Langeron (1921 and 1933), came to our notice after the NIH swab had been described.

As is noted later, some of the swab samples from patients were taken by the writers, assisted at times by other members of the Division of Zoology, and some by other persons. The time of day varied, as did also the time elapsing between examinations when more than one examination was made.

PREVIOUS INVESTIGATIONS

In Europe, various methods have been employed for obtaining pinworm eggs from the anal and perianal region, and data concerning the incidence of this parasite are available from studies made in this manner. The earliest reference which we have found relating to the examination of material secured in a manner comparable to the use of an anal swab is that of Heller, who, in 1876, in discussing methods of diagnosis, listed, first, the direct examination of the patient for migrating worms; second, the use of a small enema for removing worms from the rectum; and, last, the microscopic examination of "intestinal mucus, either from the end of the rectum by means of a spatula, or from any piece of paper that may have been made use of after a motion." Heller does not provide data as to incidence based on the use of these methods.

Data from investigations comparable to the present studies are summarized in table 1. These are from reports published by 19 authors, from 1886 to 1937, in 5 countries; namely, Germany, Finland, Soviet Russia, Sweden, and the United States. In a total of 14,427 persons, 6,574, or 45.57 percent, were positive. This includes Dahlberg's large group of 2,753 showing a very low incidence, only 81 persons, or 3.1 percent, being positive; without this group, the total would be 11,674 persons examined, with 6,493, or 55.62 percent, positive. Omitting the two reports from the United States and considering only the European studies, a total of 13,915 individuals showed 46 percent positive. The positive findings from Finland are 3 and 32 percent, respectively; from Germany they range from 19 to 76 percent, from Sweden from 45 to 70 percent, and from Soviet Russia from 48 to 93 percent. The Russians have emphasized

the desirability of making repeated examinations, and in three of their studies the individuals were examined several times. In one of these groups, in which up to seven examinations were made to establish a positive diagnosis, the highest percentage of positives of any study to date, namely, 93 percent, was obtained.[1]

[1] A paper by W. Th. Schmidt (1914), not available in time to be included in the manuscript, reports 100 patients examined for pinworm eggs at Rostock, Germany. Anal scrapings were made on children and adults by means of a curette. The 1st scraping showed 87 percent positive; additional scrapings showed 96 percent positive. Two groups of children in institutions also were examined. In the 1st group, chiefly 1 to 3 years old, 18 were examined, with 28 percent positive; in the 2nd group, boys 8 to 16 years old, 23 were examined, with 91.3 percent positive.

TABLE 1.—*Previous reports of incidence of* Enterobius vermicularis, *based on examinations of anal or perianal material* [1]

Date	Author	Number examined	Number positive	Percent positive	Method: Material	Method: Instrument	Social type	Age	Sex	Country
1886	Banik	315	95	30.15	Fecal residue around anus		Children of laborers and artisans.	Up to 14		Germany.
1905	Dahlberg in Sievers	2,753	81	3.1	Rectal feces and mucus	Small metal spoon		All		Finland.
1911	Ruotsalainen	300	95	31 67	do	Gallstone spoon	Children of laborers and artisans.	Up to 15		Do.
1919	Berndt	1,165	886	76.1	Anal scrapings	Earspoon	Children s clinic	2 to 14	M and F	Germany.
1919	Gmelin	400	76	19 0	Rectal feces	Glass tube	Militia	Adults	M	Do.
1921	v. Gottberg	200	64	32 0	Rectal mucus	Glass rod	Children of poor families	Under 15		Do.
1922	Goebel	1,000	446	44.6	Anal scrapings		Clinic	3 to 14		Do.
1925	v. Drigalski and Koch.	200	114	57 0	do	Glass spatula	School children (State school).	6 to 15		Do.
1925	Japha	200	132	66 0	do	do	School children			Do.
		285	209	73 3	do	do		1st to 8th schoo' year.	M	Do.
1927	Bogoiavlenskii and Demidova.[2]	96	89	92 7	Perianal scrapings	Match		3 to 16		Union of Soviet Socialist Republics.
1927	Serbinow and Schulmann.[3]	113	66	58 4	do	do	Child welfare centers at tobacco factories.	Up to 4		Do
1928	Panov	319	(256)	80 2	do			10 to 16		Do.
1929	Bogojawlenski and Lewitski.[4]	1,000	556	55 6	do	Match	Military conscripts		M	Do.
1929	Oleinikov	5,130	3,042	59 29	Anal and perianal scrapings	Wooden spatula				Do.
1931	Schuchat	299	147	48.2	Perianal scrapings			Children and adults.		Do.
1933	Hellsten	310				Lint greased with vaseline inserted into rectum.	Hospital patients.			Sweden.
		60	42	70 0			Asylum inmates.			
		40	27	67 5	Rectal feces		School children.			
1935	Headlee	282	62	21.99	Perianal scrapings		State Hospital patients.	15 to 60	M and F	United States.
1936	Spaak	40	18	45.0	Anal and rectal scrapings	Urethral ladle	Pediatric clinic	2 to 14		Sweden.
1937	Bozicevich	230	71	31.3	Anal scrapings	NIH swab	Mostly low social-economic level	6 to 18	M	United States.

[1] Unless otherwise stated, only one examination made
[2] Repeated examinations (up to 7)
[3] Repeated examinations (up to 4).
[4] Repeated examinations (number not stated).

In the United States, Headlee's (1935) report provided comparative findings by three different methods—fecal examination by direct smear and by the Willis flotation method, and the examination of perianal scrapings; he does not describe the instrument used in the last method, but he concludes that this method is the only one approaching reliability. His findings by the three methods are as follows: Fecal examination, by direct smear, 89 persons examined, 0 positive; by salt flotation, 505 persons examined, 17 (3.37 percent) positive; perianal scraping, 282 persons examined, 62 (21.99 percent) positive, this number of patients including 147 previously examined by one of the two methods of fecal examination. In his tabulated data Headlee shows that in 1 ward having 206 patients he examined 194 by salt flotation of feces and found 12 cases (6.19 percent), whereas examination of perianal scrapings of 128 persons from this ward revealed 45 cases (35.16 percent) positive.

In Bozicevich's (1937) report, made as a preliminary to the present investigation, 230 white boys, 6 to 18 years old, residents of Washington, D. C., were examined during their stay at a summer camp. The same method of examination was used as we have used in the present study; 72 cases of pinworm infestation were detected, an incidence of 31.3 percent.

PRESENT FINDINGS

While there are a number of studies in the literature dealing with the use of swabs in the diagnosis of oxyuriasis, much more work is desirable. In this paper we include preliminary data bearing on the matter of number of swabs necessary to establish positive and negative diagnoses; we hope to investigate this phase of the subject further, under more controlled conditions. Correlations between pinworm incidence and population groups are also given consideration here.

As mentioned in the introduction, the 1,272 individuals examined fall into two groups of approximately equal size; namely, a general population group and an institutionalized group.

General Population

The NIH cellophane type of anal swab was used for examination of all of the 628 persons of this group, a total of 1,173 swabs, or 1.9 swabs per person, being made, with the following results:

Total positive	222 persons
Total negative	406 persons
Percent positive	35.4

The 222 positive cases have been subdivided for analysis as follows:

I. Positive on all swabs............................ 148 (66.7 percent)
II. Positive on first, negative on some later swabs...... 31 (14 percent)
III. Negative on first, positive on same later swabs...... 43 (19.4 percent)

The three groups involving positive findings and a fourth group containing only negative findings are tabulated and analyzed below.

I. Positive on all swabs

148 persons = base

The number of swabs made was 253, or 1.7 swabs per person, distributed as follows:

1 swab............................ 89 persons (60.1 percent)
2 swabs............................ 39 persons (26.3 percent)
3 swabs............................ 10 persons (6.8 percent)
4 swabs............................ 7 persons (4.7 percent)
5 swabs............................ 2 persons (1.4 percent)
18 swabs............................ 1 person (0.7 percent).

This group of 148 persons with consistently positive histories furnishes data for comparison with the remaining 74 persons infested with pinworms, on whom examinations were sometimes negative and sometimes positive.

The age, sex, and race of the 148 persons represented in this group are shown in table 2.

TABLE 2.—*Classification of 148 persons on whom swab examinations were always positive*

Age (in years)	Male						Female						Sex unknown		Total	
	White		Colored		Race unknown		White		Colored		Race unknown		Colored			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Preschool (through 5)	21	14.2	2	1.35	0	0	22	14.9	7	4.7	0	0	0	0	52	35.0
6–18	34	23.0	4	2.7	0	0	25	16.9	3	2 0	0	0	0	0	66	44.6
Children, age unknown, less than 15	1	.67	0	0	3	2	3	2.0	0	0	3	2	1	.67	11	7.4
Adult	8	5.4	0	0	0	0	11	7.4	0	0	0	0	0	0	19	12.8

Summarizing these data, we see that, of the 148 persons positive on all swabs, the sexes were practically equal in number, 73 persons, or 49.4 percent, being males, and 74, or 50 percent, being females; the sex of 1 individual, 0.7 percent of the entire number, was unknown. As regards age, 129, or 87 percent, of the individuals were children

(through 18 years of age) and 19, or 13 percent, were adults. As regards race, 125 persons, or 84.5 percent of the group, were white, whereas 17 persons, or 11.5 percent, were colored; the race of 6 persons, 4 percent of the group, was unknown.

II. Positive on first, negative on some later swabs

31 persons=base

The number of swabs made was 97, or an average of 3.1 swabs per person. Of the 97 swabs made on the 31 persons with pinworm infestations, 56 swabs, or 57.7 percent, were positive.

The distribution of positive and negative findings, in this group, is shown in table 3. Of the 31 persons who were positive on the first examination, 25 were negative and 6 positive on the second examination. As regards the subsequent history of these 25 negatives, 13 had no later examinations; of the remaining 12, 6 were negative and 6 positive on the 3d examination. Of these 6 positives, 4 had no later examinations; the 2 remaining were positive on the 4th examination, 1 was positive and the other negative on the 5th examination. Of the 6 negatives on the 3d examination, 3 had no later examinations; of the 3 remaining, 1 was positive on both the 4th and 5th examinations, and the other 2 were negative on the 4th examination, of which 1 had no more examinations while the other was positive on both the 5th and 6th examinations.

TABLE 3.—*Distribution of positive and negative findings on 31 persons, positive on first examination*

[In parentheses, number for which no later examination]

1st examination						31+							
2d examination			6+						25−				
3d examination		2+		4−				6+			6−		(13)
4th examination		2−		1−	(3)		(4)	2+		1+		2−	(3)
5th examination	(1)	1+					1+	1−		1+		1+	(1)
6th examination		1+										1+	
7th examination		1+											
8th examination		1+											

As regards the subsequent history of the 6 positives of the 2d examination, 4 were negative and 2 positive on the 3d examination. Of these 4 negatives, 3 had no later examinations; the 1 remaining was negative on the 4th, its last, examination. Of the 2 positives on the 3d examination, both were negative on the 4th examination; 1 had no more examinations and the other had 4 more examinations (5th to 8th, inclusive), all positive.

The age, sex, and race of the 31 persons represented in this group are shown in table 4.

TABLE 4.—*Classification of 31 persons, positive on first, negative on some later swabs*

Age (in years)	Male				Female				Total	
	White		Colored		White		Colored			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Preschool (through 5)	3	9.7	0	0	1	3.2	0	0	4	12.8
6 to 18	8	25.8	0	0	10	32.2	1	3.2	19	61.3
Children, age unknown, less than 15	0	0	0	0	1	3.2	0	0	1	3.2
Adult	4	12.8	0	0	3	9.7	0	0	7	22.6

Summarizing these data, it is seen that, of the 31 persons who were positive on the first swab but negative on some later swabs, the sexes were about evenly divided, 15, or 48.4 percent, being males and 16, or 51.6 percent, being females. As regards age, 24, or 77 percent of the group, were children (through 18 years of age) and 7, or 23 percent, were adults. As regards race, 30, or 97 percent, were white, and the remaining 1, or 3 percent, was colored.

III. Negative on first, positive on some later swabs

43 persons = base

The number of swabs made was 144, or an average of 3.3 swabs per person. Of the 144 swabs made on the 43 persons, all of whom proved to be infested with pinworms, 64 swabs, or 44.4 percent, were positive.

The distribution of negative and positive findings in this group is shown in table 5. It is seen that, of the 43 persons who were negative on the first examination, 29 were positive and 14 negative on the second examination. As regards the subsequent history of these 29 positives, 17 had no later examinations; of the remaining 12, 6 were negative and 6 positive on the 3d examination. Of these 6 negatives, 2 had no later examinations; of the remaining 4, 1 was positive on both the 4th and 5th examinations, and of the other 3, negative on the 4th examination, 2 had no later examinations, while the remaining 1 was negative on the 5th, 6th, and 7th examinations. Of the 6 positives on the 3d examination, 4 had no later examinations; of the remaining 2, 1 was positive on the 5th, 6th, 7th, and 8th examinations, and the other was negative on the 4th and 5th examinations.

As regards the subsequent history of the 14 negatives of the 2d examination, 4 were negative and 10 positive on the 3d examination. Of these 4 negatives, 2 were positive and 2 negative on the 4th examination. The 2 positives had no later examinations; of the 2 negatives, 1 was positive and 1 negative on the 5th examination; the 1 positive had no later examinations, while the 1 negative became positive on

both the 6th and 7th examinations. Of the 10 positives on the 3d examination, 4 had no later examinations; of the remaining 6, 2 were negative and 4 positive on the 4th examination. The 2 negatives and 2 of the 4 positivrs had no later examinations; the remaining 2 were positive on the 5th examination, and of these, 1 had no later examination and the remaining 1 was positive on the 6th examination.

TABLE 5.—*Distribution of negative and positive findings on 43 persons, negative on first examination*

[In parenthesis, number for which no later examination]

1st examination								43−								
2d examination				29+								14−				
3d examination	(17)		6+		6−						10+			4−		
4th examination	(4)	1+	1−		1+	3−	(2)		(4)	4+	2−		2+		2−	
5th examination		1+	1−		1+	1−	(2)		(2)	2+				1+		1−
6th examination		1+				1−			(1)	1+						1+
7th examination		1+				1−										1+
8th examination		1+														

The age, sex, and race of the persons represented in this group are shown in table 6.

TABLE 6.—*Classification of 43 persons, negative on first, positive on some later swabs*

Age (in years)	Male				Female						Total	
	White		Colored		White		Colored		Race unknown			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Preschool (through 5)	10	23.3	0	0	5	11.6	0	0	0	0	15	34.9
6 to 18	13	30.2	1	2.3	5	11.6	0	0	0	0	19	44.1
Children, age unknown, less than 15	0	0	0	0	0	0	0	0	1	2.3	1	2.3
Adult	3	7	0	0	5	11.6	0	0	0	0	8	18.6

Summarizing these data, it is seen that of the 43 persons who were negative on the first swab but positive on some later swabs, 27 persons, or 63 percent of the group, were males and 16, or 37 percent, were females. As regards age, 35, or 81.5 percent of the group, were children (through 18 years of age) and 8, or 18.6 percent, were adults. As regards race, 41 persons, or 95.5 percent of the group, were white, 1 person, or 2.3 percent, was colored, and the race of the remaining 1, or 2.3 percent of the group, was unknown.

IV. Negative on all swabs

406 persons = base

The number of swabs made was 685, or an average of 1.7 swabs per person, distributed as follows:

1 swab	265 persons (65.2 percent)
2 swabs	90 persons (22.1 percent)
3 swabs	14 persons (3.5 percent)
4 swabs	18 persons (4.4 percent)
5 swabs	6 persons (1.5 percent)
6 swabs	7 persons (1.7 percent)
7 swabs	2 persons (0.5 percent)
8 swabs	2 persons (0.5 percent)
10 swabs	1 person (0.25 percent)
14 swabs	1 person (0.25 percent)

The age, sex, and race of the persons represented in this group are shown in table 7.

TABLE 7.—*Classification of 406 persons, on whom swab examinations were always negative*

Age (in years)	Male						Female						Total	
	White		Colored		Race unknown		White		Colored		Race unknown			
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Preschool (through 5)	71	17.5	28	6 9	0	0	52	12.8	24	5.9	0	0	175	43.1
6–18	46	11.3	7	1.7	0	0	41	10 1	9	2.2	0	0	103	25.3
Children, age unknown, less than 15	1	25	0	0	26	6.4	2	.5	0	0	29	7.2	58	14.2
Adult	23	5.7	0	0	0	0	44	10.8	3	.7	0	0	70	17.2

Summarizing these data, it is seen that, of the 406 persons who were negative on all swabs, the sexes were about evenly divided, 202 persons, or 49.8 percent, being males and 204 persons, or 50.2 percent, being females. As regards age, 336, or 82.8 percent of the group, were children (through 18 years of age) and 70 or 17.2 percent, were adults. As regards race, 280 persons, or 69 percent, were white; 71, or 17.5 percent, were colored; and the race of the remaining 55 persons, or 13.5 percent of the group, was unknown.

SUMMARY OF FINDINGS ON GENERAL POPULATION GROUPS

The four groups, for which swab examinations have been reported in detail above, may be summarized as follows:

[illegible]
Total number of persons positive...... 222
Percent positive........................ 35. 4

Distribution by sex

	Males	Females	Sex unknown
Positive	115	106	1
Negative	202	204	0
Total	317	310	1
Percent positive	36. 3	34. 2	100

Distribution by race

	White	Colored	Race unknown
Positive	196	19	7
Negative	280	71	55
Total	476	90	62
Percent positive	41. 2	21. 1	11. 3

Distribution by age

	Children			Adults
	Preschool (through 5 years)	School (6–18 years)	Age unknown, under 15 years	
Positive	71	104	13	34
Negative	175	103	58	70
Total	246	207	71	104
Percent positive	28. 9	50. 3	18. 3	32. 8

Total children positive...... 188
Total children negative...... 336
Total children................ 524
Percent positive.............. 35. 8

The present findings indicate, therefore, as regards pinworm infestations, that—

Sex is not a factor of importance; males showed a very slightly higher percentage of infestation than females.

White persons are more frequently parasitized than colored; in this series the percentage of infestation is almost twice as great for whites as for colored. However, the number of colored persons is too small for the data to be conclusive.

Age is not a factor of importance; children showed a very slightly higher percentage of infestation than adults. However, preschool

children and adults showed a lower percentage than children of school age (6 to 18 years). This is true even if the children of unknown age were all of school age,[2] making 117 positives out of a total of 278, or 42 percent positive, a considerably higher percentage than that of the preschool or the adult group.

VALUE OF REPEATED SWAB EXAMINATIONS

An extremely important practical consideration in the diagnosis of pinworm infestation is the number of anal swab examinations which should be made before a negative diagnosis is justified. The present data may throw a little light on this problem. It is recognized, however, that the variable factors in this series of examinations are numerous.

There is always, of course, the variation in *severity of infestation* in different cases, which influences the frequency of appearance of pinworms in the anal region and their consequent discovery by the use of a swab. There are high variables in numbers of worms present, numbers migrating, and days on which they migrate or fail to migrate.

Of importance also is the question which has been raised by European parasitologists, of a possible *cyclic nature of the infestation*, with the worms disappearing and reappearing at certain periods. We have found no evidence of this. In group I, the 18 positive swabs made on one individual, a 3-year old white female, covered a period of almost 4 months, the days on which swabs were made being as follows: 1st, 3d, 4th, 9th, 14th, 15th, 22d, 23d, 28th, 29th, 36th, 46th, 48th, 49th, 65th, 66th, 113th, and 114th day after the investigation was started. During this time several different kinds of treatment were administered, but without altering the positive character of subsequent examinations.

In our examinations, too, the *time of day* at which the swab was made was variable. It was usually early morning, immediately after the person had risen and before bathing or use of the toilet; this was supposedly true of all adult cases, the swab being made by the person involved, and was true in many of the children's cases, the swab being made by the mother or father. However, in some cases swabs were made in both the late evening and early morning; on the other hand, in a considerable number of cases the swab was made on children at clinics during the day, usually in the morning.

The time *elapsing between examinations* was also variable, sometimes swabs being made on successive days, or a longer period of several days to several weeks intervening. In group III, of individuals who were first negative, then proved positive, the time elapsing between

[2] The evidence is strongly to the contrary, as these were all cases from Children's Hospital, most of them from the dispensary, where many of the patients are of preschool age.

examinations in some cases was sufficiently long to have allowed an infestation to be acquired subsequent to the first examination.

Different *persons making the swab* contributed another highly variable factor, and it is probable that certain techniques of making the swab are more effective in picking up pinworm eggs than are others. We have found that a firm stroking motion, directed outward from the anal opening, parallel to and penetrating the folds, and repeated so that most of the area immediately surrounding the opening has been swabbed, is the most effective technique.

Granted that our results may have been affected by the fact that the examinations were made at different times of day, with different periods of time elapsing between examinations, and by different persons, presumably these differences would result in *fewer* positive findings than would have been secured had a better, that is, a more controlled, system of examinations been possible, and consequently our percentages of positives are undoubtedly lower than those actually existing. Also, group IV, containing only cases of negative findings, would undoubtedly have yielded a considerable number of positive cases had it been possible to repeat the examinations on a larger percentage of those individuals. From the data it is seen that, of the 222 positive cases, 40 percent had only one swab, that is, the 89 persons of group I, and 60 percent were reexamined, whereas in group IV, 406 negative cases, 65 percent had only one swab and only 35 percent were reexamined.

With the varying set of conditions previously noted, the results of repeated examinations were as follows:

Of 628 persons, 179 (28.5 percent) were positive on the 1st swab.

Of 184 persons, negative on 1st swab, 29 (15.7 percent) were positive on the 2d swab.

Of 65 persons, negative on 1st and 2d swabs, 10 (15.4 percent) were positive on the 3d swab.

Of 41 persons, negative on 1st to 3d swabs, inclusive, 2 (4.9 percent) were positive on the 4th swab.

Of 21 persons, negative on 1st to 4th swabs, inclusive, 1 (4.8 percent) was positive on the 5th swab.

Of 14 persons, negative on 1st to 5th swabs, inclusive, 1 (7.1 percent) was positive on the 6th swab.

Of 13 persons, negative on the 1st to 6th swabs, inclusive, none (0 percent) proved positive on later swabs.

From another point of view:

Of 628 persons, 222 (35 percent) were positive.

Of these 222 positives—

80.7 percent showed positive on the 1st swab.
93.7 percent showed positive on the 1st or 2d swab.
98.2 percent showed positive on the 1st, 2d, or 3d swab.
99.1 percent showed positive on the 1st, 2d, 3d, or 4th swab.
99.5 percent showed positive on the 1st, 2d, 3d, 4th, or 5th swab.
100 percent showed positive on the 1st, 2d, 3d, 4th, 5th, or 6th swab.

If only one swab examination had been made on all 628 persons, the positive cases would have consisted only of 148 cases of group I plus 31 cases of group II, a total of 179, or 28.5 percent positive, rather than a total of 222, or 35.4 percent positive.

The manner in which successive examinations increase the percent of positives in a group is strikingly illustrated if we select from our series the 49 individuals on each of whom 4 swabs were made. The findings were as follows:

	1st swab	2d swab	3d swab	4th swab
Previous positives	0	15	21	27
New positives	15	6	6	2
Total positives	15	21	27	29
Negatives	34	28	22	20
Percent positive	30.6	42.8	55.0	59.1

These 49 individuals were distributed over a wide area; they included children of various ages and adults, both sexes and both races. The difference between the 59.1 percent of positives in this group, examined four times, and the 35.4 percent of our entire series of 628 persons, on whom an average of 1.9 swabs per person was made, is a strong argument for the advisability of repeated examination in the diagnosis of pinworm infestation.

FECAL EXAMINATIONS

As noted earlier in this paper, fecal examinations are inadequate for diagnosis of pinworm infestations, because of the habit of the female worm of migrating to the perianal region and depositing the eggs on the skin. In connection with the examination of persons in our general population series, a relatively small number of fecal specimens were examined from the same individuals on whom anal swab examinations were made, to obtain comparative data as to the results of the two methods in the diagnosis of the infestation; in addition, a small series of fecal specimens were examined from individuals from whom no anal swab material was available. The findings in both cases are given below.

FECAL EXAMINATIONS IN ADDITION TO ANAL SWABS

In most cases salt flotation was the only method of preparation employed for examination of feces. In a few negative cases the direct smear method and other methods also were tried; screening of the feces and examination for worms were done in a few cases.

Of group I, "Positive on all swabs", fecal specimens were examined from 13 individuals, of which 2, or 15 percent, were positive for pinworm eggs.

Of group II, "Positive on first, negative on some later swabs", fecal specimens were examined from 4 individuals, of which none, or 0 percent, were positive for pinworm eggs.

Of group III, "Negative on first, positive on some later swabs", fecal specimens were examined from 8 individuals, of which 1, or 12.5 percent, was positive for pinworm eggs.

Summarizing these three groups, 25 fecal specimens were examined from *known* pinworm cases, with only 3, or 12 percent, showing the presence of pinworm eggs in the feces.

Of group IV, "Negative on all swabs", fecal specimens were examined from 22 individuals, of which 1, or 4.5 percent, was positive for pinworm eggs, and 1 other (4.5 percent) was found to contain two immature female pinworms, but no pinworm eggs. An anal swab made the same day on the latter individual was negative. These two positive findings are definite evidence that our group IV contained positive cases which were undetected by swab examinations but which probably would have come to light if more swab examinations had been made. The finding of nongravid females indicates that fecal examinations, including screening of the feces and examination of the residue on the screen, might be of value in diagnosis, especially if the individual had received enemas or if cathartics had been used, which would have removed gravid migrating females and thus have prevented depositing of eggs in the perianal region.

FECAL EXAMINATIONS ONLY

From 33 individuals, fecal specimens alone were available for examination, of which 2, or 6 percent, proved positive for pinworm eggs. All except one of these individuals were children under 15 years of age, in whom both positives occurred; the remaining individual was an adult female.

According to the above findings on *known* pinworm cases, only 12 percent were positive on fecal examination; if this percentage held true in the present group, so that the 2 positive findings were only 12 percent of the actual positives, the number of the latter would be 16. The series is too small and there are too many variables for conclusions to be drawn.

Institutionalized Individuals of Adolescent Age

For comparison with the results of examinations of the 628 persons from the general population of the District of Columbia and nearby vicinities, discussed previously, we have the results of examinations on 644 persons in two institutions, the National Training School for Boys and the National Training School for Girls, in Washington, D. C. Of these the boys' school is much larger than the girls' school. In a continuing investigation at the former, 617 boys have been

examined, as compared with 27 girls examined on one occasion at the latter institution.

As regards the boys, the investigation divides itself into two distinct parts. In May 1936, anal swabs were made on all boys then at the school, totaling 400, the results of those examinations indicating the number of pinworm cases *in* the school at that time. Subsequently, however, all boys were examined *at the time of entrance* in the school, the boys coming from widely scattered areas throughout the United States.

The 400 boys were examined during the time that various types of anal scrapers and swabs were being tested, before the development of the NIH cellophane-tipped swab. Hall (1937), as noted at the beginning of this paper, has reported on these various types and our reasons for discarding them; he refers also to these same 400 boys. A single swab examination was made on each boy, in the early evening (6 to 8 p. m.), after the evening meal. The number of boys examined with each type of swab, and the findings, are as follows:

Cotton swab:		
Used wet	106 persons	3 positive.
Used dry	8 persons	1 positive.
Rayon swab:		
Used wet	97 persons	0 positive.
Used dry	50 persons	1 positive.
Used damp	24 persons	1 positive.
Chamois swab:		
Used wet	52 persons	0 positive.
Celluloid scraper:		
Used dry	63 persons	0 positive.
Total	400 persons	6 positive (1.5 percent).

Classification of these cases was as follows:

White: Total 187; positive 3; percent positive 1.6.
Colored: Total 213; positive 3; percent positive 1.4.

Age of positives:
White: 17, 18, and 20 years, respectively.
Colored: 14, 14, and 15 years, respectively.

Length of stay in school, by positives, from time of entry to time of examination:
White: Approximately 10 months, 2 years, and 3 years.
Colored: Approximately 4, 9, and 10 months.

Distribution of positives as to living quarters:

White: All three boys in same cottage, the cottage having a total of 62 boys.
Colored: 2 in one cottage, having a total of 61 boys, and 1 in another cottage, having a total of 56 boys.

Fecal specimens from the 6 positive individuals were all negative as regards pinworm eggs.

As stated above, examinations for pinworms were made subsequently on all boys at the time of their commitment to the school, a

total of 217 boys to date. The NIH cellophane type of anal swab was used in all these cases; the swab was made during the day, when the general physical examination was given.

The results of these examinations were as follows:

Total boys examined	217
Total boys positive	17
Percent positive	7.8

Classification according to race and age was as follows:

White boys

Age (in years)	Total number	Number positive	Percent positive
11–15	20	3	15.0
16–18	90	11	12.2
19	2	0	0
Total	112	14	[1] 12.5

[1] Average.

Colored boys

Age (in years)	Total number	Number positive	Percent positive
11–15	43	2	4.7
16–18	62	1	1.6
Total	105	3	[1] 2.9

[1] Average.

Fecal specimens from the 17 individuals from whom anal swabs had proved positive for pinworms showed only 1 specimen positive for pinworm eggs, only 5.8 percent of known positive cases being detected by this method.

COMPARISON OF TWO SERIES OF EXAMINATIONS OF BOYS

Combining the original set of 400 examinations, of which 1.5 percent were positive, made during May 1936, with the examinations made during the following 10 months on 217 boys at time of entry, of which 7.8 percent were positive, there were 617 boys examined, with 3.7 percent positive. Of those examined, 299 were white and 318 were colored boys. The differences in the percentages of infestations in the two races is striking; the white boys of the former group showing a percentage of positives of 1.6, and of the latter group, 12.5; whereas the percentage of positives for colored boys of the former group was 1.4, and of the latter group, 2.9. Factors which may account for the later findings being decidedly higher than the earlier ones include the difference in type of swabs used—various types which were later discarded as not satisfactory, as compared with the cellophane type—and different histories of the boys—one group which had

been living under excellent sanitary conditions during their stay in the school, as compared with another group just arriving at the school from all sorts of environments.

The higher percentage of infestation in boys of the white race as compared with those of the colored race is an interesting finding; similar differences were noted in the series representing the general population. We do not feel that the numbers examined are sufficiently large, or other factors in the history of the individuals sufficiently well known, for a conclusion to be drawn as to whether or not the difference in infestation is correlated with the difference in race. Our initial assumption would be that the determining factors are such things as social-economic status with its bearing on sanitation, crowding, personal hygiene, bathing facilities, and similar factors. The indicated racial correlation runs so definitely counter to the expectation on the social-economic basis that we have no satisfactory explanation for our findings. In general, we do not expect the incidence with parasitic worms to show any positive correlation with race, and we should require much more evidence before we could regard such a correlation as soundly established.

EXAMINATION OF INSTITUTIONALIZED GIRLS

The NIH cellophane swab was used, and one swab examination was made of each girl during the morning. Twenty-seven girls were examined, and no cases of pinworm infestation were found. The girls were all between the ages of 14 and 18 years, except 3 who were 19, and 2 who were 20 years old. There were 4 white and 23 colored girls.

This group is too small to be comparable to the other groups examined. Judging from the percentage of infestation (35.4 percent) of the general population series, we would have expected to find several cases of pinworm infestation among the 27 girls; however, judging from the results of the examination of 400 institutionalized boys, reported above, among whom only 6 cases were found, the absence of cases is not surprising.

COMPARISON OF FINDINGS OF PRESENT AND OF PREVIOUS INVESTIGATIONS

Of the previous investigations included in our tabulated summary (p. 1485), where the method of diagnosis was somewhat similar to ours, Banik, Ruotsalainen, and also v. Gottberg found percentages of infestation similar to ours; Banik examined children to 14 and the other two authors children to 15 years of age, getting 30 percent in the first case and 32 percent in the two latter cases, for the entire groups, as compared with our 36 percent in children to 18 years old. Higher percentages in children were found by Goebel and by Spaak, both 45 percent, by Japha, 66 and 73 percent, by Berndt, 76 percent, and by

Panov, 80 percent. Bogoiavlenskii and Demidova report the highest incidence findings of any study to date, 89 out of 96 children, or 93 percent, being found infested by the very thorough method of repeating the examinations until up to seven examinations had been made. Von Drigalski and Koch, with 57 percent in children 6 to 15 years old, had results fairly comparable with our 50 percent in children aged 6 to 18 years. Hellsten's figures, 67.5 percent, are higher for a small group (40) of children of similar ages, diagnosed by a different method; i. e., examination of rectal material obtained by insertion of lint. Serbinow and Schulmann obtained twice as high a percentage (58 percent) in young children as did we (29 percent). Schuchat's findings of 35.5 percent in noninstitutionalized children and 33.3 percent in adults, are practically identical with ours of 35.8 and 32.8 percent, respectively; however, the institutionalized children in his survey were far more heavily parasitized (62.7 percent) than the noninstitutionalized, which is the reverse of our findings. Bozicevich's recent examinations of 230 boys of the same locality as that of ours showed 31 percent infested, as compared with 50 percent infested in our 207 children of both sexes, the children of both series being of school age.

SUMMARY

Data are presented as to incidence of pinworm infestation and correlations between incidence and population groups, with observations on certain phases of diagnostic technique. Examinations were made on 1,272 individuals, residing in or near Washington, D. C. Anal swabs were made in all cases, the swab used on over two-thirds of the individuals being the NIH swab, a cellophane-tipped kind. Fecal examinations also were made in a number of cases, the findings furnishing a comparison with the findings on anal swabs.

About one-half of the individuals examined belonged to the general population, residing in homes in widely scattered localities, most of them from the low social-economic level. Individuals comprising the other half of the series were institutionalized adolescents, 12 to 20 years old, some of whom had only recently come to the institution from other parts of the United States.

Of the 628 persons of the general population group, some were seen at various clinics, and through these individuals swab examinations were sometimes made on other members of their families; various physicians, nurses, and teachers also secured material of this nature, in addition to the writers and other members of the division staff. The swabs were, therefore, not all made by the same person or with the same technique, or at the same time of day; and when repeated examinations were made, the period of time between examinations was not standardized. With these highly variable factors, as to

method, the results of examination of the 628 persons, using 1,173 anal swabs, showed 222 persons, or 35.4 percent, infested with pinworms. The individuals examined do not represent a random sample of the population, in many cases the swab examinations being made because of the presence of clinical symptoms or because the individual belonged to a family in which one or more other members had been found to be positive.

In this general population group, the two sexes were almost equally represented in total numbers and in percent positive, 36 percent of 317 males and 34 percent of 310 females being positive. The two races, white and colored, were not equally represented, the former predominating. Of 476 white persons, 41 percent were positive, whereas of 90 colored persons, 21 percent were positive. This appears to be the first report of perianal examinations of Negroes for pinworms. It is highly desirable that larger numbers of individuals of this race be examined, as the present number is too small for the findings to be interpreted as indicating a correlation between pinworm incidence and race. As regards age, 36 percent of children up to 18 years old, as compared with 33 percent of adults, were positive. Children of school age showed a higher percentage of infestation than those of preschool age—50 percent of the former as compared with 29 percent of the latter. At the moment, we suggest the possibility that this indicates that infestations acquired in the school environment increased the incidence among school children.

In order to analyze the variations in the results of examinations of persons infested with pinworms, the positive cases have been subdivided into 3 groups; namely, 148 persons who were positive on all swabs, 31 persons positive on first but negative on some later swabs, and 43 persons negative on first but positive on some later swabs. In the first group, of 253 swab examinations, 100 percent were positive; in the second group, of 97 swab examinations, 57.7 percent were positive; in the third group, of 144 swab examinations, 44.4 percent were positive. The total number of swabs on the 222 persons was 494, of which 373, or 75.5 percent, were positive. If there is any significance in the differences shown by these groups, they may indicate different degrees of severity of infestation.

The findings confirm the work of European writers as to the value of *repeating* the swab examination, in the case of negative findings, in establishing a diagnosis; in this series, 94 percent of the positive cases were detected on either the first or second examination, but as many as 6 swabs were made before a positive diagnosis was obtained in one case. In 49 individuals on whom 4 examinations were made, the findings rose from 31 percent on the first to 59 percent on the fourth examination, or, in other words, the first examination detected about half of the cases found to be positive after 4 examinations. Of the

406 persons making up the negative cases in the general population group, 65 percent had only 1 swab examination and 22 percent only 2 swab examinations, a total of 685 swabs or an average of 1.7 swabs per person being made. It is concluded that a larger number of cases of pinworm infestation would undoubtedly have been found had it been possible to repeat the examinations on a larger percentage of these negative cases, and that the 35.4 percent positive finding is lower than actually existed among the 628 persons.

At the two institutions, one for girls and one for boys, all of the same age group, examinations consisted of only one anal swab per person. No pinworm cases were found among the girls, a small group of 27. The survey of the boys indicated an incidence of 1.5 percent infestation in 400 boys in the institution in May 1936; of 217 examinations made later on other boys at the time of their arrival at the same institution, an incidence of 7.8 percent was found.

The thesis that fecal examination is inadequate for the diagnosis of pinworm infestation is supported by the findings in this investigation—pinworm eggs were demonstrated in only 4 out of 42, or 9.5 percent, of fecal specimens from individuals shown by positive swabs to be infested with pinworms. The proportion here would be highly variable. While about 1 out of 10 positives was detected by fecal examinations in this series, other workers have shown very diverse figures; Headlee (1935) found about 1 out of 6.

In the United States there has been previously no study of incidence comparable to the present one, in the number of individuals examined and the population groups represented. Headlee found an incidence of 22 percent in 282 individuals institutionalized in Illinois; from our own locality, Bozicevich got an incidence of 31 percent by a single swab examination on 230 boys in a summer camp. European investigations have, in almost all instances, given percentages of infestation similar to or higher than those of our general population group. The data in 17 reports from 4 countries, namely, Germany, Finland, Sweden, and Soviet Russia, show a total of 13,915 individuals examined, with an average of 46 percent positive for pinworms, the positive findings ranging from 3 to 93 percent.

The evidence indicates that pinworms are much more prevalent than is generally believed, that the usual methods employed in diagnostic laboratories and in the majority of surveys, namely, fecal examination for eggs, is not reliable for their detection, and that examinations by a method such as the use of the NIH swab should be repeated several times before a negative diagnosis is justified. The present study is a continuing one, and it is expected that additional data will help to answer some of the questions raised here. Well-informed parasitologists have known and said for many years that pinworms are the commonest of the helminth parasites of man, yet this

fact still remains generally unrecognized, and, as a medical problem, oxyuriasis is probably the most neglected of all human helminthiases. So far as we have data from the city of Washington and its vicinity, an area of unusually high social-economic level, the indications are that what has been found true of the prevalence of oxyuriasis in the world in general will be found true of oxyuriasis in the United States.

ACKNOWLEDGMENTS

By far the greater part of the examinations on persons of the general population were made through cooperation at Providence Hospital, where facilities were provided for a parasite clinic, and where members of the dispensary staff and of the social-service department were most generous in aiding the study, for which courtesy the writers wish to express their great appreciation. In addition, the cooperation of the Child Hygiene Service of the District of Columbia, of Children's Hospital, and of Gallinger Hospital is gratefully acknowledged. The institutional surveys were made possible through the very hearty interest of, and efficiently conducted investigations by, officials at the National Training School for Boys and the National Training School for Girls.

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DEATHS DURING WEEK ENDED OCT. 2, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 2, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	7,861	7,285
Average for 3 prior years	7,245	
Total deaths, first 39 weeks of year	338,737	338,538
Deaths under 1 year of age	489	556
Average for 3 prior years	535	
Deaths under 1 year of age, first 39 weeks of year	21,835	21,687
Data from industrial insurance companies:		
Policies in force	69,912,986	68,530,210
Number of death claims	12,491	11,114
Death claims per 1,000 policies in force, annual rate	9.3	8.5
Death claims per 1,000 policies, first 39 weeks of year, annual rate	9.9	10.0

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (..............) indicate that cases or deaths may have occurred although none was reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 9, 1937, and Oct. 10, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936
New England States:								
Maine	1	1	....	1	5	8	0	0
New Hampshire	....	1	....	2	1	2	0	0
Vermont	....	....	....	....	5	....	0	0
Massachusetts	1	8	....	....	19	53	1	0
Rhode Island	....	1	....	....	4	4	1	0
Connecticut	6	2	3	....	3	6	1	0
Middle Atlantic States:								
New York	22	23	[1] 10	[1] 6	65	54	6	8
New Jersey	7	5	8	8	34	19	0	0
Pennsylvania	23	47	....	....	228	25	6	0
East North Central States.								
Ohio	25	20	....	2	72	10	0	2
Indiana	17	22	37	30	18	1	0	2
Illinois	23	35	12	7	57	8	3	2
Michigan	17	14	....	....	24	21	4	1
Wisconsin	4	5	17	20	22	18	0	1
West North Central States:								
Minnesota	9	1	1	....	3	8	0	0
Iowa	4	7	1	....	3	4	3	4
Missouri	30	10	39	111	53	8	1	0
North Dakota	....	2	....	....	1	2	0	0
South Dakota	....	....	....	....	....	....	0	0
Nebraska	3	1	....	....	....	1	0	0
Kansas	4	8	4	....	1	....	4	1
South Atlantic States:								
Delaware	....	1	....	....	2	4	0	0
Maryland [2]	7	8	3	5	3	4	2	2
District of Columbia	4	10	....	....	1	5	0	1
Virginia	64	41	....	....	9	8	4	3
West Virginia	34	17	8	7	11	....	0	2
North Carolina [3]	107	122	5	3	31	....	1	1
South Carolina	18	23	98	96	4	4	0	1
Georgia [3]	35	28	....	....	....	....	0	0
Florida [3]	20	5	....	3	8	1	0	2

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 9, 1937, and Oct. 10, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936
East South Central States:								
Kentucky	31	24	6	13	33	29	1	2
Tennessee	34	48	12	10	21	2	2	4
Alabama [3]	44	43	30	9			0	2
Mississippi [3]	15	22					1	0
West South Central States:								
Arkansas	25	9	15	1	4	1	2	0
Louisiana [3]	8	15	4	14		2	0	1
Oklahoma [4]	23	10	32	10	7	1	0	3
Texas [3]	48	27	170	56	20	6	1	1
Mountain States:								
Montana	1			25	10		0	0
Idaho			5	3	10	2	0	0
Wyoming					2	1	0	0
Colorado	4	9			10	2	2	0
New Mexico	3	3		1	8	20	1	0
Arizona		1	24	12			0	0
Utah [2] [4]			12		81	5	1	0
Pacific States:								
Washington	1				6	15	1	0
Oregon	1		13	15	6	5	0	1
California	17	22	15	17	17	17	0	2
Total	740	701	579	487	922	386	49	49
First 40 weeks of year	17,719	18,438	277,409	142,230	246,318	269,668	4,548	6,279

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers	
	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936
New England States:								
Maine	10	0		18	0	0	5	2
New Hampshire	2	0	1	4	0	0	1	0
Vermont	2	0	10	7	0	0	8	0
Massachusetts	7	2	76	69	0	0	6	2
Rhode Island	0	0	19	17	0	0	0	1
Connecticut	6	1	29	19	0	0	3	1
Middle Atlantic States:								
New York	43	9	145	185	0	0	25	46
New Jersey	9	2	43	18	0	0	7	5
Pennsylvania	18	7	188	174	0	0	29	47
East North Central States:								
Ohio	7	24	126	88	0	0	17	21
Indiana	4	10	124	75	1	0	1	8
Illinois	37	94	169	195	0	2	16	24
Michigan	26	18	243	156	1	2	9	14
Wisconsin	15	7	66	115	0	0	5	1
West North Central States:								
Minnesota	17	2	54	59	3	0	1	2
Iowa	18	5	44	56	0	0	11	6
Missouri	20	5	133	27	9	0	20	18
North Dakota	0	0	12	24	15	2	2	3
South Dakota	1	1	11	20	0	1	1	5
Nebraska	11	0	2	16	0	0	0	2
Kansas	19	6	113	56	0	0	5	6
South Atlantic States:								
Delaware	0	0	4	1	0	0	0	3
Maryland [3]	2	2	32	37	0	0	11	12
District of Columbia	1	1	9	7	0	0	1	2
Virginia	1	0	35	22	0	0	17	24
West Virginia	4	1	79	35	0	0	10	25
North Carolina [3]	3	0	68	42	0	0	14	15
South Carolina	0	0	4	9	0	0	3	12
Georgia [3]	0	7	39	31	0	0	10	31
Florida [3]	2	1		11	0	0	2	1

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 9, 1937, and Oct. 10, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers	
	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936	Week ended Oct. 9, 1937	Week ended Oct. 10, 1936
East South Central States:								
Kentucky	0	4	37	24	0	0	16	43
Tennessee	1	15	32	28	7	0	22	10
Alabama [3]	3	9	19	17	0	0	10	16
Mississippi [2]	10	4	25	11	1	0	9	10
West South Central States:								
Arkansas	7	1	21	3	0	0	24	6
Louisiana [3]	4	1	11	8	0	0	11	5
Oklahoma [4]	15	0	29	7	16	1	22	6
Texas [3]	29	1	52	19	0	0	56	25
Mountain States:								
Montana	0	4	10	24	7	11	3	1
Idaho	2	0	11	16	6	0	0	2
Wyoming	0	0	12	6	0	0	0	0
Colorado	15	1	15	14	4	0	11	6
New Mexico	0	2	18	8	4	0	13	20
Arizona	0	0	3	10	0	0	0	5
Utah [2] [5]	2	0	33	11	0	0	1	0
Pacific States:								
Washington	11	4	22	43	8	4	3	8
Oregon	2	2	18	20	1	0	1	2
California	17	10	102	128	7	0	13	8
Total	403	263	2,338	1,990	90	23	455	512
First 40 weeks of year	8,127	3,091	174,922	187,629	8,374	6,140	12,221	11,337

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Oct. 9, 1937, 66 cases, as follows: North Carolina, 1; Georgia, 32; Florida, 4; Alabama, 20; Louisiana, 2; Texas, 7.
[4] Figures for 1936 are exclusive of Oklahoma City and Tulsa.
[5] Rocky Mountain spotted fever, week ended Oct. 9, 1937, as follows: Utah, 1 case.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
August 1937										
Arizona	8	5	44	5	8	-------	3	7	0	17
Arkansas	1	41	18	1,005	16	36	52	26	0	187
California	14	79	33	23	90	5	157	222	27	63
September 1937										
Connecticut	1	21	9	-------	7	-------	53	48	0	13
Delaware	1	0	-------	1	-------	-------	6	13	0	5
District of Columbia	2	24	2	-------	7	-------	13	19	0	5
Maine	1	6	1	[1] 3	11	-------	52	21	0	12
Missouri	5	55	139	235	94	1	141	216	7	114
Nebraska	0	5	-------	-------	7	-------	71	22	-------	2
Pennsylvania	19	83	-------	2	528	1	175	378	0	185
Tennessee	4	114	51	216	132	19	7	89	0	78
West Virginia	7	84	62	2	55	-------	9	159	1	58

[1] Imported.

Summary of monthly reports from States—Continued

August 1937

	Cases
Actinomycosis:	
California	1
Chicken pox:	
Arizona	5
Arkansas	7
California	197
Dysentery:	
Arizona	46
California (amoebic)	8
California (bacillary)	51
Encephalitis, epidemic or lethargic:	
Arizona	1
California	14
Food poisoning:	
California	50
German measles:	
California	36
Granuloma, coccidioidal:	
California	1
Jaundice, epidemic:	
California	2
Mumps:	
Arizona	4
Arkansas	15
California	345
Ophthalmia neonatorum:	
California	2
Paratyphoid fever:	
Arkansas	6
California	4
Rabies in animals:	
California	164
Relapsing fever:	
California	7
Septic sore throat:	
Arkansas	9
California	4
Tetanus:	
California	2
Trachoma:	
Arizona	30
California	8
Trichinosis:	
California	1
Tularaemia:	
Arkansas	2
California	8
Undulant fever:	
Arizona	1
California	9
Whooping cough:	
Arizona	35
Arkansas	69
California	1,218

September 1937

	Cases
Anthrax:	
Pennsylvania	1
Chicken pox:	
Connecticut	18
Delaware	3
District of Columbia	5
Maine	24
Missouri	5
Nebraska	7
Pennsylvania	167
Tennessee	6
West Virginia	7
Conjunctivitis, infectious:	
Connecticut	1
Dysentery:	
Connecticut (bacillary)	14
Delaware	1
District of Columbia (amoebic)	2
Missouri	38
Pennsylvania (bacillary)	1
Tennessee (amoebic)	4
Tennessee (bacillary)	34
West Virginia (amoebic)	1
Encephalitis, epidemic or lethargic:	
Connecticut	2
Missouri	89
Nebraska	7
Pennsylvania	2
Tennessee	2
German measles:	
Connecticut	8
Delaware	1
Maine	5
Pennsylvania	25
Tennessee	3
Hookworm disease:	
Tennessee	1
Impetigo contagiosa:	
Tennessee	8
Mumps:	
Connecticut	83
Delaware	1
Maine	11
Missouri	8
Nebraska	10
Pennsylvania	362
Tennessee	36
Ophthalmia neonatorum:	
Connecticut	4
Pennsylvania	1
Tennessee	5

September 1937—Continued

	Cases
Paratyphoid fever:	
Connecticut	7
Tennessee	8
West Virginia	1
Puerperal septicemia:	
Tennessee	2
Rabies in animals:	
Connecticut	3
Missouri	5
West Virginia	2
Rocky Mountain spotted fever:	
District of Columbia	1
Tennessee	1
Septic sore throat:	
Connecticut	8
Missouri	25
Nebraska	4
Tennessee	6
Tetanus:	
Maine	1
Missouri	3
Trachoma:	
Connecticut	1
Pennsylvania	4
Tennessee	5
Tularaemia:	
Missouri	3
Tennessee	3
Typhus fever:	
Tennessee	2
Undulant fever:	
Connecticut	9
Maine	2
Missouri	3
Pennsylvania	5
Tennessee	1
West Virginia	1
Vincent's infection:	
Maine	12
Tennessee	9
Whooping cough:	
Connecticut	133
Delaware	40
District of Columbia	28
Maine	96
Missouri	223
Nebraska	22
Pennsylvania	1,200
Tennessee	143
West Virginia	225

CASES OF VENEREAL DISEASES REPORTED FOR AUGUST 1937

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

State	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama	1,483	5.18	374	1.31
Arizona [1]				
Arkansas [2]	257	1.27	142	.70
California	1,490	2.46	1,662	2.74
Colorado [1]				
Connecticut	208	1.20	137	.79
Delaware	187	7.22	53	2.05
District of Columbia [1]				
Florida	1,494	9.10	292	1.78
Georgia	1,557	5.09	425	1.39
Idaho	37	.76	33	.68
Illinois	1,929	2.46	1,273	1.62
Indiana [1]				
Iowa	304	1.20	238	.94
Kansas	153	.81	68	.36
Kentucky	483	1.68	296	1.03
Louisiana	207	.98	113	.53
Maine [2]	43	.50	70	.82
Maryland	754	4.50	335	2.00
Massachusetts	528	1.19	490	1.11
Michigan	629	1.32	694	1.45
Minnesota	314	1.19	319	1.21
Mississippi	2,037	10.14	2,632	13.11
Missouri	584	1.48	275	.69
Montana [3]	78	1.47	53	1.00
Nebraska	89	.65	102	.75
Nevada [3]				
New Hampshire	32	.63	25	.49
New Jersey	918	2.12	341	.79
New Mexico	107	2.54	34	.81
New York [2]	1,703	1.32	717	.55
North Carolina	3,004	8.69	826	2.39
North Dakota	30	.43	51	.73
Ohio [2]	817	1.22	423	.63
Oklahoma [3]	486	1.92	429	1.70
Oregon	102	1.00	221	2.17
Pennsylvania [4]	1,561	1.54	283	.28
Rhode Island	66	.97	54	.79
South Carolina [1]				
South Dakota [3]	27	.39	45	.65
Tennessee	718	2.51	403	1.41
Texas	545	.89	316	.52
Utah	2	.04	9	.17
Vermont	24	.63	28	.74
Virginia	1,132	4.24	376	1.41
Washington	830	2.01	630	3.83
West Virginia [2]	266	1.45	123	.67
Wisconsin [4]	39	.13	142	.49
Wyoming [3]				
Total	26,754	2.22	15,552	1.29

See footnotes at end of table.

Reports from cities of 200,000 population or over

City	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Akron, Ohio				
Atlanta, Ga.	158	5.50	125	4.35
Baltimore, Md.	441	5.34	221	2.68
Birmingham, Ala.	208	7.37	103	3 65
Boston, Mass.	190	2.40	169	2.14
Buffalo, N. Y.	234	3.95	66	1.12
Chicago, Ill.	1,929	5.41	1,273	3.57
Cincinnati, Ohio [1]				
Cleveland, Ohio	191	2.05	123	1.32
Columbus, Ohio	19	.62	10	.33
Dallas, Tex.	256	8.84	122	4.21
Dayton, Ohio	68	3.23	4	.19
Denver, Colo.	70	2.36	54	1.82
Detroit, Mich.	232	1.34	318	1.84
Houston, Tex.[1]				
Indianapolis, Ind.[1]				
Jersey City, N. J.[1]				
Kansas City, Mo.	108	2.56		
Los Angeles, Calif.[1]				
Louisville, Ky.	114	3.52	87	2.69
Memphis, Tenn.	250	9.36	114	4.27
Milwaukee, Wis.[3]				
Minneapolis, Minn.	68	1.40	101	2 08
Newark, N. J.	201	4.34	119	2.57
New Orleans, La.[1]				
New York, N. Y.[1]				
Oakland, Calif.	80	2 64	86	2.84
Omaha, Nebr.	62	2.81	37	1.68
Philadelphia, Pa.	544	2 74	39	.20
Pittsburgh, Pa.	106	1.55	38	.56
Portland, Oreg.[3]				
Providence, R. I.	40	1.54	27	1.04
Rochester, N. Y.	50	1.48	45	1.33
St. Louis, Mo.	390	4 67	264	3.16
St. Paul, Minn.	20	.71	35	1.24
San Antonio, Tex.	83	3 30	83	3.39
San Francisco, Calif.	189	2.82	270	4.03
Seattle, Wash.	196	5 16	238	6.27
Syracuse, N. Y.	83	3.81	40	1.84
Toledo, Ohio	105	3.45	64	2.10
Washington, D. C.[1]				

[1] No report for current month.
[2] Incomplete.
[3] Not reporting.
[4] Only cases of syphilis in the infectious stage are reported.

WEEKLY REPORTS FROM CITIES

City reports for week ended Oct. 2, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	206	100	20	112	340	537	5	346	87	851	
Current week [1]	113	54	21	194	376	496	2	353	81	932	
Maine:											
Portland	0		0	0	2	1	0	0	1	11	28
New Hampshire.											
Concord	0		0	1	0	0	0	0	0	0	7
Manchester											
Nashua	0		0	0	0	0	0	0	0	0	5
Vermont:											
Barre	0		0	0	0	1	0	1	0	0	2
Rutland	0		0	0	0	0	0	0	0	0	6
Massachusetts:											
Boston	1		0	6	16	26	0	8	0	14	205
Fall River	0		0	0	1	1	0	0	0	3	33
Springfield	0		0	0	0	0	0	1	0	15	29
Worcester	0		0	0	4	5	0	1	1	9	42
Rhode Island:											
Pawtucket	0		0	0	0	3	0	0	0	0	15
Providence	0		0	0	3	4	0	0	1	46	57
Connecticut:											
Bridgeport	0		0	1	0	0	0	0	0	0	29
Hartford	0	1	0	0	3	2	0	0	1	0	35
New Haven	0	1	0	0	1	2	0	2	0	3	42
New York:											
Buffalo	0		0	1	5	15	0	6	0	18	147
New York	18	12	3	23	66	24	0	75	14	147	1,356
Rochester	0		0	0	3	1	0	0	2	10	66
Syracuse	1		0	9	4	2	0	0	0	8	41
New Jersey:											
Camden	0		0	0	1	0	0	0	2	0	28
Newark	0		0	2	1	5	0	7	0	22	92
Trenton	0		0	2	1	2	0	3	0	12	28
Pennsylvania:											
Philadelphia	5	2	2	5	17	34	0	29	6	37	455
Pittsburgh	2	3	2	38	16	20	0	8	1	41	179
Reading	0		0	0	0	3	0	2	0	2	20
Scranton	0			2		0	0		0	2	
Ohio:											
Cincinnati	2	1	1	0	7	13	0	9	0	11	139
Cleveland	4	10	0	12	12	26	0	11	1	22	184
Columbus	1	1	1	1	2	9	0	3	1	2	73
Toledo	2		0	3	1	3	0	3	0	22	63
Indiana:											
Anderson	0		0	1	0	2	0	0	0	0	6
Fort Wayne	1		0	0	0	5	0	0	0	0	21
Indianapolis	0		0	2	9	10	0	3	0	17	105
Muncie	0		0	0	1	6	2	0	0	0	8
South Bend	0		0	0	1	0	0	0	0	4	15
Terre Haute	0		0	1	0	0	0	0	0	0	17
Illinois:											
Alton	0		0	1	0	1	0	0	0	0	7
Chicago	8	2	1	19	34	44	0	41	4	44	668
Elgin	0		0	0	2	1	0	0	0	0	7
Moline	0		0	0	0	0	0	0	0	3	6
Springfield	0		0	1	0	1	0	0	0	4	23
Michigan:											
Detroit	11		1	14	19	44	0	15	3	70	250
Flint	1		0	1	3	10	0	0	0	6	18
Grand Rapids	1		0	4	1	9	0	0	0	18	35
Wisconsin:											
Kenosha	0		0	0	0	0	0	1	0	0	8
Madison	0		0	0	1	2	0	0	0	2	24
Milwaukee	0		0	9	1	3	0	0	0	47	76
Racine	0		0	1	0	5	0	1	0	2	11
Superior	0		0	0	0	0	0	0	0	0	4

[1] Figures for Galveston and Boise estimated; reports not yet received.

City reports for week ended Oct. 2, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Minnesota:											
Duluth	0		0	0	2	1	0	0	0	6	28
Minneapolis	0		0	4	3	6	0	1	1	9	83
St. Paul	1		0	0	3	0	0	3	0	6	50
Iowa:											
Cedar Rapids	0			1		0	0			2	
Davenport	0			0		0	0		0	0	
Des Moines	0		0	0		8	0		0	0	23
Sioux City	0			0		2	0		0	6	
Waterloo	0			0		4	0		0	1	
Missouri:											
Kansas City	0		1	0	5	9	0	4	3	6	94
St. Joseph	0		0	0	8	4	0	5	0	0	41
St. Louis	11		1	7	7	36	0	3	6	5	209
North Dakota:											
Fargo	0		0	0	0	1	0	0	0	13	7
Grand Forks	0			0		0	0		0	0	
Minot	0		0	0	0	0	0	1	0	0	3
South Dakota:											
Aberdeen	0			1		0	0		0	2	
Nebraska:											
Omaha	0		0	0	5	1	0	1	0	2	61
Kansas:											
Lawrence	0		0	0	0	0	0	0	0	0	4
Topeka	0		0	0	0	5	0	0	0	5	9
Wichita	0		0	0	2	10	0	0	0	2	25
Delaware:											
Wilmington	0		0	0	6	1	0	0	0	1	30
Maryland:											
Baltimore	5	3	1	1	13	10	0	16	1	77	208
Cumberland	0		1	0	0	1	0	0	0	0	14
Frederick	0		0	0	1	0	0	0	0	0	4
District of Columbia:											
Washington	2		0	3	5	4	0	3	1	1	125
Virginia:											
Lynchburg	4		0	0	0	0	0	0	1	3	9
Norfolk	0		0	0	1	3	0	0	0	2	30
Richmond	0		0	1	2	6	0	4	2	2	54
Roanoke	0		0	0	0	4	0	0	0	2	9
West Virginia:											
Charleston	1		0	0	2	0	0	1	1	0	12
Huntington	3			4		3	0		0	0	
Wheeling	0		0	0	2	0	0	0	1	2	21
North Carolina:											
Gastonia	2			0		0	0		0	0	
Raleigh	0		0	0	1	0	0	1	0	5	17
Wilmington	0		0	0	0	0	0	0	0	3	11
Winston-Salem	0		0	0	4	1	0	1	0	7	25
South Carolina:											
Charleston	0		0	0	3	2	0	0	6	0	19
Florence	0		0	0	2	0	0	0	0	0	9
Greenville	0		0	0	0	1	0	0	0	0	11
Georgia:											
Atlanta	5	5	2	0	4	5	0	6	4	9	79
Brunswick	0		0	0	1	0	0	0	0	0	4
Savannah	2	2	0	0	0	0	0	1	1	1	30
Florida:											
Miami	2		0	2	2	1	0	0	0	0	24
Tampa	1		0	2	1	1	0	3	0	0	21
Kentucky:											
Covington	0		0	0	2	1	0	2	0	1	15
Lexington	0		0	1	0	0	0	1	0	1	18
Louisville	1	1	0	1	3	12	0	1	0	12	72
Tennessee:											
Knoxville	2		1	0	1	3	0	0	2	0	29
Memphis	3		0	1	3	5	0	2	1	7	77
Nashville	3		0	0	1	0	0	1	0	0	61
Alabama:											
Birmingham	0	3	0	0	3	3	0	5	0	1	86
Mobile	1		1	0	0	0	0	1	0	0	21
Montgomery	3			0		4	0		0	2	
Arkansas:											
Fort Smith	0			0		1	0		0	0	
Little Rock	0		0	0	3	1	0	0	1	0	4

City reports for week ended Oct. 2, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Louisiana:											
Lake Charles	0	------	0	0	2	0	0	0	0	0	9
New Orleans	0	1	1	0	8	0	0	9	3	2	153
Shreveport	0	------	0	0	3	2	0	1	0	0	30
Oklahoma:											
Muskogee	1	------	------	0	------	0	0	------	0	0	------
Oklahoma City	1	6	0	0	5	0	0	1	0	0	44
Texas:											
Dallas	5	------	0	1	4	5	0	1	1	0	56
Fort Worth	1	------	0	1	0	4	0	0	0	4	25
Galveston	------	------	------	------	------	------	------	------	------	------	------
Houston	0	------	1	0	6	3	0	8	0	0	86
San Antonio	1	------	0	0	1	1	0	7	3	2	48
Montana:											
Billings	0	------	0	0	4	0	0	0	0	0	9
Great Falls	0	------	0	0	1	0	0	0	0	1	7
Helena	0	------	0	0	0	0	0	0	0	0	1
Missoula	0	------	0	0	0	0	1	0	0	0	2
Idaho:											
Boise	------	------	------	------	------	------	------	------	------	------	------
Colorado:											
Colorado Springs	0	------	0	0	2	2	0	1	0	0	11
Denver	4	------	0	7	3	12	0	4	3	5	90
Pueblo	0	------	0	0	1	0	0	0	0	0	4
New Mexico:											
Albuquerque	0	------	0	0	1	1	0	3	0	5	13
Utah:											
Salt Lake City	2	------	0	2	1	1	0	1	0	4	34
Washington:											
Seattle	1	------	0	2	3	2	0	8	0	12	97
Spokane	0	1	1	1	0	3	0	1	0	6	30
Tacoma	0	------	0	0	2	1	1	0	0	4	30
Oregon:											
Portland	1	2	0	5	3	2	0	2	0	1	58
Salem	0	1	------	0	------	0	0	------	0	0	------
California:											
Los Angeles	5	5	0	8	8	16	0	17	3	37	260
Sacramento	0	------	0	0	1	1	0	2	0	3	16
San Francisco	0	1	0	1	6	4	0	5	0	36	159

City reports for week ended Oct. 2, 1937—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths	
Maine:			
Portland	0	0	2
Massachusetts:			
Boston	0	0	5
Worcester	0	0	1
Connecticut:			
Hartford	0	0	1
New York:			
Buffalo	1	0	2
New York	6	1	21
Rochester	0	0	1
New Jersey:			
Trenton	0	0	1
Pennsylvania:			
Philadelphia	0	0	16
Pittsburgh	2	0	6
Reading	1	1	0
Ohio:			
Cleveland	1	0	1
Columbus	0	0	1
Toledo	0	0	1
Indiana:			
Indianapolis	0	0	3
Illinois:			
Chicago	1	0	19
Springfield	1	0	1
Michigan:			
Detroit	3	0	7
Flint	0	0	1
Grand Rapids	0	1	2
Wisconsin:			
Milwaukee	0	0	5
Minnesota:			
Duluth	0	0	2
Minneapolis	0	0	8
St. Paul	0	0	10
Iowa:			
Des Moines	0	0	1
Sioux City	1	0	1
Missouri:			
Kansas City	0	0	5
St. Joseph	1	0	0
St. Louis	0	0	5
Nebraska:			
Omaha	0	0	6
Kansas:			
Wichita	0	0	3
Maryland:			
Baltimore	3	2	4
District of Columbia:			
Washington	0	0	2
Virginia:			
Richmond	1	0	0
Georgia:			
Atlanta	0	0	1
Kentucky:			
Louisville	0	0	1
Tennessee:			
Memphis	0	0	1
Alabama:			
Birmingham	0	0	1
Louisiana:			
New Orleans	0	0	1
Shreveport	0	1	6
Texas:			
Dallas	0	0	2
Fort Worth	0	0	2
Houston	0	0	4
Colorado:			
Colorado Springs	0	0	3
Denver	0	0	1
Pueblo	0	0	[1] 5
Utah:			
Salt Lake City	0	0	2
Washington:			
Tacoma	0	0	1
California:			
Los Angeles	0	0	2
Sacramento	0	0	2

[1] 4 nonparalytic cases included.

Encephalitis, epidemic or lethargic.—Cases: New York, 1; Alton, 2; Minneapolis, 1; Kansas City, 1; St. Louis, 54.

Pellagra.—Cases: Winston-Salem, 1; Charleston, S. C., 2; Atlanta, 1; Savannah, 3; Tampa, 1; Los Angeles, 1.

Rabies in man.—Deaths: Tampa, 1.

Typhus.—Cases: Charleston, S. C., 2; Savannah, 2; Fort Worth, 1.

FOREIGN AND INSULAR

CUBA

Habana—Communicable diseases—4 weeks ended September 25, 1937.—During the 4 weeks ended September 25, 1937, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	16		Tuberculosis	13	2
Malaria	[1] 80	1	Typhoid fever	[1] 11	2
Poliomyelitis	1				

[1] Includes imported cases.

Provinces—Notifiable diseases—4 weeks ended September 18, 1937.—During the 4 weeks ended September 18, 1937, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer		1	2	6	1	2	12
Diphtheria	1	15	2	1		2	21
Dysentery (bacillary)		1					1
Leprosy	1	5				1	7
Malaria	85	79	110	136	35	183	628
Measles		2	4				6
Poliomyelitis	1	1				1	3
Scarlet fever			1				1
Tuberculosis	41	36	32	73	209	20	411
Typhoid fever	27	71	32	59	24	22	235
Yaws						15	15

GERMANY

Vital statistics—First quarter 1937.—Following are vital statistics for Germany for the first quarter of 1937:

Number of marriages	117, 075
Number of marriages per 1,000 population	6. 9
Number of births	329, 193
Number of births per 1,000 population	19. 5
Number of stillbirths	8, 735
Number of deaths	231, 193
Number of deaths per 1,000 population	13. 7
Deaths under 1 year of age	25, 351
Deaths under 1 year of age per 100 live births	7. 9

IRISH FREE STATE

Vital statistics—Second quarter ended June 30, 1937.—The following vital statistics for the Irish Free State for the quarter ended June 30, 1937, are taken from the Quarterly Return of Marriages, Births, and Deaths, issued by the Registrar General, and are provisional:

	Number	Rate per 1,000 population		Number	Rate per 1,000 population
Marriages	3,725	5.1	Deaths from—Continued.		
Births	15,140	20.6	Influenza	506	0.69
Total deaths	11,214	15.2	Measles	23	
Deaths under 1 year of age	1,078	[1] 71	Puerperal sepsis	9	[1] 59
Deaths from:			Scarlet fever	36	
Cancer	867	1.18	Tuberculosis (all forms)	1,015	1.38
Diarrhea and enteritis (under 2 years of age)	134		Typhoid fever	13	
Diphtheria	75		Typhus fever	4	
			Whooping cough	76	

[1] Per 1,000 births.

SWEDEN

Notifiable diseases—August 1937.—During the month of August 1937, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Diphtheria	20	Poliomyelitis	[1] 303
Dysentery	55	Scarlet fever	709
Epidemic encephalitis	2	Syphilis	24
Gonorrhea	1,276	Undulant fever	17
Paratyphoid fever	65	Typhoid fever	19

[1] Includes 48 cases nonparalytic at time of notification.

YUGOSLAVIA

Communicable diseases—4 weeks ended September 12, 1937.—During the 4 weeks ended September 12, 1937, certain communicable diseases were reported in Yugoslavia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	96	6	Poliomyelitis	12	2
Cerebrospinal meningitis	8	1	Scarlet fever	317	4
Diphtheria and croup	688	32	Sepsis	4	3
Dysentery	613	50	Tetanus	46	17
Erysipelas	193	3	Typhoid fever	836	67
Measles	15	1	Typhus fever	10	
Paratyphoid fever	55	4			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for September 24, 1937, pages 1354-1368. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued October 29, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

China.—During the week ended October 2, 1937, cholera was reported in China as follows: Hong Kong, 24 cases; Kwangchow Wan, 20 cases; Shanghai, 513 cases, 156 deaths.

Indochina (French).—During the week ended October 2, 1937, cholera was reported in French Indochina as follows: Haiphong, 120 cases; Hanoi, 5 cases; Tonkin Province, 683 cases.

Japan.—Cholera has been reported in Japan as follows: Week ended October 2, 1937, 1 case in Kobe; week ended October 9, 1937, 1 case in Tokyo.

Plague

India—Cochin.—On September 18, 1937, 2 cases of plague were reported in Cochin, India.

Yellow Fever

Colombia.—Yellow fever has been reported in Colombia as follows: Boyaca Department—Muzo, August 18, 1937, 1 death; Maripi, August 22, 1 death. Cundinamarca Department—Paime, July 17, 1937, 1 death. Santander Department—Landazuri, August 27, 1937, 2 deaths.

Gold Coast—Somanya.—On September 30, 1937, 1 fatal case of yellow fever was reported in Somanya, Gold Coast.

Senegal.—Yellow fever has been reported in Senegal as follows: Rufisque, 1 case, September 29, 1937; Dakar, 1 case imported from Diourbel, October 4, 1937.

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UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 52 OCTOBER 29, 1937 NO. 44

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

September 12–October 9, 1937

The accompanying tables summarize the prevalence of eight important communicable diseases based on weekly telegraphic reports from State health departments. The reports from each State are published in the PUBLIC HEALTH REPORTS under the section "Prevalence of Disease." Table 1 gives the number of cases of poliomyelitis reported by each State in recent weeks of 1937 and in corresponding weeks of 1936, 1935, and 1934, and table 2 gives the number of cases of eight important communicable diseases, including poliomyelitis, for the 4-week period ending October 9, the number reported for the corresponding period in 1936, and the median number for the years 1932–36.

DISEASES ABOVE MEDIAN PREVALENCE

Poliomyelitis.—The peak of the current epidemic-like wave of poliomyelitis was apparently reached during the week ended September 18, and by the last week of the period under consideration (week ended Oct. 9) the incidence had dropped about 55 percent. Later reports for the week ended October 16 indicate a still further decline in practically all regions.

Compared with recent years the incidence for the current 4-week period (2,615 cases) for the country as a whole was approximately two and one-half times that for the corresponding period in 1936, 1934, and 1932, and double the incidence in 1933. In 1935 an unusual incidence of the disease was recorded for the regions along the Atlantic coast, and a total of 2,528 cases was reported for this period.

Although reports for the current 4 weeks show that poliomyelitis is on the decline, the number of cases in the West South Central region was more than 11 times that for the corresponding period in 1936 and 1935 and more than 7 times the incidence in 1934. The North Central and North Atlantic regions also continued to report a high incidence, and the incidence was somewhat above the seasonal expectancy in some States in the Mountain and Pacific regions. The East South Central and South Atlantic regions reported fewer cases than last year, but in both regions the current incidence was higher than the average for recent years. The slight epidemic of

1936 was confined mostly to the East South Central region. Table 1 shows for each State the number of cases reported since the beginning of the current year, with comparative data for the corresponding period in the 3 preceding years. It includes also the weekly number in each State for recent weeks of 1937.

TABLE 1.—*Poliomyelitis cases reported in each State during recent weeks of 1937* [1]

Division and State	41 weeks ended—				Cases reported in 1937 for week ended—									
	Oct. 13, 1934	Oct 12, 1935	Oct. 10, 1936	Oct. 16, 1937	Aug. 14	Aug. 21	Aug 28	Sept 4	Sept. 11	Sept. 18	Sept. 25	Oct. 2	Oct. 9	Oct. 16
All States [2]	6,292	9,296	3,111	8,449	455	492	622	641	817	879	730	603	463	366
New England:														
Maine	15	119	35	125	8	6	8	19	12	16	6	8	10	8
New Hampshire	8	52	3	21	1	1	5	4	0	1	1	0	2	2
Vermont	8	33	9	26	2	3	5	0	1	6	3	2	2	0
Massachusetts	66	1,240	50	347	25	41	51	44	44	41	2'	16	7	5
Rhode Island	1	304	2	14	2	0	1	3	0	4	2	0	0	1
Connecticut	14	351	12	95	8	6	7	10	13	16	11	8	6	7
Middle Atlantic:														
New York	203	2,615	171	606	22	39	64	52	91	91	61	45	43	20
New Jersey	62	416	26	144	6	14	8	10	13	21	21	12	9	10
Pennsylvania	105	160	88	307	14	21	22	19	37	40	66	31	18	7
East North Central:														
Ohio	221	89	180	524	45	22	50	31	66	59	28	40	7	18
Indiana	48	30	39	138	8	12	7	11	18	10	10	8	4	3
Illinois	176	201	483	743	32	54	46	106	130	81	66	72	37	16
Michigan	185	550	98	417	24	21	31	34	49	57	63	44	26	13
Wisconsin	89	55	35	252	10	6	13	23	19	45	44	34	15	26
West North Central.														
Minnesota	67	58	22	267	5	10	14	18	30	52	53	28	17	20
Iowa	26	44	47	204	8	7	14	16	26	35	31	18	18	11
Missouri	29	30	36	330	16	13	29	25	36	47	33	20	20	10
North Dakota	10	10	12	6	0	0	0	3	1	0	1	0	0	0
South Dakota	35	7	10	26	0	1	0	5	4	3	6	2	1	0
Nebraska	13	13	16	188	14	15	19	19	27	18	7	18	11	5
Kansas	59	24	48	234	13	13	15	14	20	30	36	26	19	9
South Atlantic:														
Delaware	3	5	1	8	0	0	1	0	5	0	1	0	0	0
Maryland	20	87	24	81	13	5	7	6	11	7	9	7	2	2
District of Columbia	8	78	7	28	1	3	8	4	0	2	6	2	1	2
Virginia	62	661	47	57	4	1	2	1	3	5	4	1	1	2
West Virginia	75	37	40	63	1	5	7	4	2	2	3	2	4	1
North Carolina	38	634	39	95	6	5	4	8	1	4	1	2	8	3
South Carolina	10	28	16	21	2	0	1	0	1	1	0	0	0	0
Georgia	17	18	87	68	0	5	4	2	0	5	1	2	0	2
Florida	14	15	27	30	2	3	1	2	4	1	2	0	2	1
East South Central:														
Kentucky	97	273	56	121	2	4	4	8	4	4	5	2	0	1
Tennessee	50	71	303	107	1	1	5	2	3	1	1	4	1	3
Alabama	42	50	389	66	4	2	4	5	7	3	1	1	3	2
Mississippi	20	12	110	278	11	11	8	10	10	4	9	8	10	8
West South Central:														
Arkansas	11	21	9	316	19	10	7	6	12	9	12	12	7	8
Louisiana	13	86	22	108	8	6	4	4	7	8	5	8	4	1
Oklahoma	11	10	11	414	23	19	25	9	14	19	13	21	15	10
Texas	102	64	83	615	45	51	34	36	21	33	17	26	29	21
Mountain: [2]														
Montana	285	5	15	26	1	3	1	3	1	4	4	3	0	2
Idaho	115	1	13	11	0	0	0	1	0	0	2	1	2	0
Wyoming	7	2	6	38	6	0	10	0	2	5	8	1	0	0
Colorado	15	9	44	196	8	21	28	20	21	21	9	31	15	12
New Mexico	10	6	18	20	2	1	1	0	1	3	1	0	0	2
Arizona	102	15	5	19	0	0	2	1	2	3	0	0	0	2
Utah	11	6	3	23	1	0	1	2	5	4	2	3	2	8
Pacific:														
Washington	617	26	57	58	0	3	5	1	2	10	6	6	11	4
Oregon	61	13	25	43	1	3	0	2	4	2	3	3	2	3
California	3,030	662	282	525	36	25	44	36	37	46	35	30	17	25

[1] A similar table appeared in the PUBLIC HEALTH REPORTS for Sept. 3, 1937, p. 1208, and Oct. 1, p. 1370.
[2] Exclusive of Nevada, from which State no report is received.

From the beginning of the current year through the week ended October 16 there have been approximately 8,450 cases of poliomyelitis reported. This number, with the exception of the incidence (9,296 cases) in 1935, is the highest recorded for any year since 1931, when the number of cases for the corresponding period totaled approximately 13,600. While the West South Central and North Central regions have been the most affected, the incidence in practically all sections of the country has been somewhat above the normal seasonal level. The incidence in the South Atlantic and South Central regions fell considerably below that of last year, owing to the fact that the minor outbreak of 1936 occurred in those regions.

Influenza.—During the current period the influenza incidence increased about 60 percent over that for the preceding 4-week period. The number of cases (1,955) was also about 60 percent greater than that for the corresponding period in 1936, although it was only slightly larger than the number reported in 1935. In the West North Central region the disease was less prevalent than at this time last year, but all other regions reported increases over last year's figures. An increase of this disease is expected at this season of the year; and while the current incidence is somewhat higher than in 1936, the number of cases, except in the West South Central States, compares very favorably with the average for recent years.

Smallpox.—The number of cases (232) of smallpox reported for the 4 weeks ended October 9 was the highest recorded for any corresponding period since 1931. The high incidence was confined mostly to certain States in the Far West and West Central regions. The West North Central region reported 60 for the current period as against 34 last year; the West South Central region, 21 as against none; and the Pacific region, 76 as against 7. States in those regions that reported more than the usual seasonal incidence were Washington, North Dakota, Montana, Oklahoma, and Idaho.

Measles.—The incidence of measles has been relatively high. The incidence during the current period (3,081 cases) was about 2.6 times that for this period in 1936 and almost 35 percent above the average level for the 5 preceding years. The disease was more prevalent than last year in all regions except the New England and Pacific, in which regions the incidence fell slightly below that of last year.

Meningococcus meningitis.—For the entire country the incidence of meningitis (212 cases) dropped about 10 percent from the high level of 1936 and 1935, but it still maintained a high position in relation to the years 1934, 1933, and 1932, when the numbers of cases reported for this period were 130, 135, and 179, respectively. Compared with last year the incidence was higher in the West North Central and West South Central regions, considerably lower in the South Atlantic and East South Central regions, and approximately the same

in other regions. The number of cases reported from the South Atlantic and South Central regions appeared to be somewhat above the preceding 5-year median but in all other regions the incidence was about normal for this season of the year.

TABLE 2.—*Number of reported cases of 8 communicable diseases in the United States during the 4-week period Sept. 12–Oct. 9, 1937, the number for the corresponding period in 1936, and the median number of cases reported for the corresponding period 1932–36* [1]

Division	Current period	1936	5-year median	Current period	1936	5-year median	Current period	1936	5-year median	Current period	1936	5-year median
	Diphtheria			Influenza [2]			Measles [3]			Meningococcus meningitis		
United States [1]	2,849	2,248	3,821	1,955	1,225	1,867	3,081	1,183	2,306	212	237	179
New England	1	33	56	12	5	13	107	215	173	7	10	10
Middle Atlantic	200	157	301	65	55	54	1,083	302	523	48	44	44
East North Central	389	276	537	237	142	253	682	195	410	41	45	44
West North Central	160	107	364	123	148	154	189	65	158	22	8	17
South Atlantic	1,064	803	1,139	535	419	742	249	73	250	34	60	26
East South Central	485	453	819	163	65	138	195	49	83	25	45	19
West South Central	329	252	512	614	186	232	117	30	59	18	10	10
Mountain	98	45	75	101	82	62	319	84	98	7	7	6
Pacific	93	122	130	105	123	141	140	170	344	10	8	9
	Poliomyelitis			Scarlet fever			Smallpox			Typhoid fever		
United States [1]	2,615	1,027	1,072	7,431	5,215	8,277	232	123	123	2,211	2,340	2,885
New England	189	21	35	382	322	454	0	0	0	63	32	52
Middle Atlantic	458	77	557	1,125	966	1,326	0	0	0	322	269	362
East North Central	750	417	230	2,312	1,588	2,300	16	30	25	341	380	444
West North Central	550	87	59	1,098	456	831	60	34	19	210	166	205
South Atlantic	83	107	63	849	558	981	5	4	2	359	525	585
East South Central	57	149	41	442	393	676	7	8	2	233	302	461
West South Central	233	20	20	302	149	212	21	0	15	413	439	371
Mountain	124	53	17	425	271	298	47	40	12	180	138	164
Pacific	171	96	96	496	512	572	76	7	22	90	89	93

[1] 48 States. Nevada is excluded, and the District of Columbia is counted as a State in these reports.
[2] 44 States and New York City. The median is for the years 1933–36, only; the data for 1932 are not comparable.
[3] 46 States. Mississippi and Georgia are not included.

DISEASES BELOW MEDIAN PREVALENCE

Typhoid fever.—The reported incidence of typhoid fever (2,211 cases) represents a low level in relation to recent years. Compared with last year the incidence was high in the New England, Middle Atlantic, West North Central, and Mountain regions, low in the South Atlantic, East North Central, and South Central regions, and approximately the same in the Pacific region.

Scarlet fever.—For the current 4-week period 7,431 cases of scarlet fever were reported, an increase of approximately 4,000 over the preceding 4-week period. All regions contributed to this increase. A comparison with recent years shows that the current incidence was about 40 percent in excess of that for the corresponding period in 1936, but it was considerably below the incidence in each of the 4 preceding

years, when the numbers of cases for this period totaled 8,277, 8,353, 8,107, and 8,293, respectively. Each region, except the Pacific, reported an increase over last year, but the largest increases occurred in the West North Central and West South Central regions.

Diphtheria.—The number of cases of diphtheria (2,849) reported for the current 4-week period was almost twice the number reported for the preceding 4 weeks. The number was also about 27 percent higher than that recorded for the corresponding period in 1936, but it was considerably lower than that for preceding years. In the New England region the current incidence was approximately the same as last year, and in the Pacific region the disease was less prevalent, but all other regions reported a higher incidence than last year, the increases ranging from 7 percent in the East South Central region to about 50 percent in the West North Central. While the current incidence was higher than in 1936 it remained well below the average level of the preceding 5 years in all regions except the Mountain.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the 4 weeks ended October 9, based on data received from the Bureau of the Census, was 10.4 per 1,000 inhabitants (annual basis). For the same period in 1936 and 1935 the rate was 10.0. An increase in the death rate is expected at this season of the year, but the current rate is considerably above the average rate of 9.9 per 1,000 for the years 1931–36. In 1930 the rate (10.4) for this period was the same as the current rate.

SICKNESS AMONG MALE INDUSTRIAL EMPLOYEES DURING THE SECOND QUARTER AND FIRST HALF OF 1937 [1]

By Dean K. Brundage, *Senior Statistician, United States Public Health Service* [2]

SECOND QUARTER OF 1937

The frequency of cases of sickness and nonindustrial accidents causing absence from work for more than 1 week, as shown by the reports of a group of 25 companies employing approximately 184,000 males, was approximately the same during the second quarters of 1937 and 1936, the rates being, respectively, 88.2 and 89.0. While the respiratory diseases as a group showed a somewhat lower rate during the second quarter of 1937 than in the same quarter of the preceding year, the subgroups, diseases of the pharynx and tonsils, and "other respiratory diseases", disclosed higher rates. The rate of new cases of

[1] From the Division of Industrial Hygiene of the National Institute of Health, U. S. Public Health Service, Washington, D. C.

[2] With the assistance of Miss Elizabeth S. Frasier, Junior Statistician.

influenza during the second quarter of 1937 (9.4 cases per 1,000 males) shows a considerable improvement since the first quarter, when the high rate of 61.7 cases per 1,000 males was recorded.[3] During the first half of 1937, the influenza rate was 34.4 cases per 1,000 males, or about 70 percent higher than for the like period of 1936, or the 5-year period, 1932–36.

The rate for the nonrespiratory diseases in the second quarter of 1937 was approximately the same as for the corresponding months of 1936. Rates in the second quarter of 1937 in excess of the rates for the same quarter of the preceding year were shown for diarrhea and enteritis, hernia, neurasthenia and the like, "other diseases of the nervous system", "other genito-urinary diseases", diseases of the skin, infectious and parasitic diseases, ill-defined and unknown causes, and "all other diseases." A decrease in incidence was recorded for diseases of the stomach, "other digestive diseases", the rheumatic group, and diseases of the heart and arteries, and nephritis.

FIRST HALF OF 1937

Notwithstanding the very unfavorable beginning in 1937, as shown by the frequency rate of sickness and nonindustrial accidents for the first quarter,[3] the rate for the first half of 1937 was only about 15 percent above the rate for the first half of 1936, and 22 percent above the 5-year period 1932–36.

Practically no change was shown in the frequency of cases of nonindustrial accidents during the first half of the three periods under comparison, namely, 1937, 1936, and 1932–36.

TABLE 1.—*Frequency of disability lasting 8 calendar days or longer in the second quarter of 1937 as compared with the same quarter of 1936, and in the first half of 1937 as compared with corresponding periods of preceding years (male morbidity experience of industrial companies which reported cases to the U. S. Public Health Service)*[1]

Diseases and disease groups which caused disability (numbers in parentheses are disease title numbers from the International List of the Causes of Death, fourth revision, Paris, 1929)	Annual number of disabilities per 1,000 men				
	Second quarter of—		First half of—		
	1937	1936	1937	1936	1932–36
Sickness and nonindustrial injuries[2]	88.2	89.0	117.1	101.3	96.1
Nonindustrial injuries	11.3	10.3	10.8	10.9	10.7
Sickness[2]	76.9	78.7	106.3	90.4	85.4
Respiratory diseases	27.8	29.7	56.9	41.7	38.0
Bronchitis, acute and chronic (106)	4.0	4.8	5.7	6.1	4.3
Diseases of the pharynx and tonsils (115a)	6.2	5.0	6.1	5.2	5.3
Influenza and grippe (11)	9.4	12.4	34.4	20.6	20.1
Pneumonia, all forms (107–109)	2.7	2.7	3.6	3.8	2.7
Tuberculosis of the respiratory system (23)	.8	.9	.8	.9	.9
Other respiratory diseases (104, 105, 110–114)	4.7	3.9	6.3	5.1	4.7

See footnotes at end of table.

[3] For the first quarter of 1937, see Pub. Health Rep., 52: 1169–1171 (August 27) 1937.

TABLE 1.—*Frequency of disability lasting 8 calendar days or longer in the second quarter of 1937 as compared with the same quarter of 1936, and in the first half of 1937 as compared with corresponding periods of preceding years (male morbidity experience of industrial companies which reported cases to the U. S. Public Health Service)*—Continued

Diseases and disease groups which caused disability (numbers in parentheses are disease title numbers from the International List of the Causes of Death, fourth revision, Paris, 1929)	Annual number of disabilities per 1,000 men				
	Second quarter of—		First half of—		
	1937	1936	1937	1936	1932–36
Nonrespiratory diseases	49.1	49.0	49.4	48.7	47.4
Diseases of the stomach, cancer excepted (117–118)	3.7	4.2	3.8	3.9	3.7
Diarrhea and enteritis (120)	1.4	1.2	1.2	1.2	1.0
Appendicitis (121)	4.6	4.6	4.6	4.3	3.8
Hernia (122a)	1.8	1.6	1.6	1.8	1.6
Other digestive diseases (115b, 116, 122b–129)	2.1	3.1	2.4	3.0	3.1
Rheumatic group, total	9.6	10.9	9.7	10.5	11.0
Rheumatism, acute and chronic (56, 57)	4.5	5.1	4.5	4.7	5.4
Diseases of the organs of locomotion (156b)	3.2	3.3	2.9	3.4	3.2
Neuralgia, neuritis, sciatica (87a)	1.9	2.5	2.3	2.4	2.4
Neurasthenia and the like (part of 87b)	1.4	1.3	1.1	1.1	1.1
Other diseases of the nervous system (78–85, part of 87b)	1.2	1.1	1.0	1.2	1.3
Diseases of the heart and arteries and nephritis (90–99, 102, 130–132)	3.6	3.8	4.2	4.2	4.2
Other genito-urinary diseases (133–138)	2.6	2.3	2.4	2.4	2.4
Diseases of the skin (151–153)	2.9	2.4	3.0	2.4	2.4
Infectious and parasitic diseases (1–10, 12–22, 24–33, 36–44)	3.9	2.9	3.9	3.2	3.0
Ill-defined and unknown causes (200)	3.5	2.9	3.6	2.6	2.0
All other diseases (45–55, 58–77, 88, 89, 100, 101, 103, 154–155a, 157, 162)	6.8	6.7	6.9	6.9	6.8
Average number of males covered in the record	184,304	150,248	178,529	146,661	143,566
Number of companies included	25	25	25	25	25

[1] In 1936 and 1937 the same companies are included. The rates for the first half of the years 1932–36 include 20 of these companies which employed an average of 112,734 men during these months or 79 percent of the 143,566 representing the sample population for the 5 years.
[2] Exclusive of disability from the venereal diseases and a few numerically unimportant causes of disability.

As usual, the respiratory diseases as a group showed greater variation in incidence than the nonrespiratory disease group. For diseases of the respiratory system, the 1937 rate (56.9 cases per 1,000 males) exceeded that for 1936 by 36 percent and the 5-year average by 49 percent. Diseases of the pharynx and tonsils, and "other respiratory diseases" occurred more frequently in the first half of 1937 than in the same part of either of the two earlier periods under consideration. The incidence of pneumonia has increased during the past 2 years. The rate for influenza based on the first 6 months of 1937 was approximately 70 percent above the corresponding frequency in 1936 as well as 1932–36. Of the respiratory diseases, tuberculosis alone in 1937 has thus far a favorable rate.

Among diseases of the digestive system, an increase was recorded for appendicitis. The rate in 1937 was 4.6 cases per 1,000 males as compared with 4.3 for 1936 and 3.8 for the period 1932–36.

For the three periods under comparison there was practically no change in the frequency of neuralgia, neuritis, and sciatica; neurasthenia and the like; diseases of the heart, arteries, and nephritis; "other

genito-urinary"; and "all other diseases." The rheumatic group of diseases decreased somewhat in the first 6 months of 1937 as compared with the previous years.

In 1937 the frequency of cases diagnosed as "ill-defined and unknown causes" showed an increase over the frequency in 1936 and that for 1932–36.

As stated in previous reports these data were obtained from establishments in various sections of the United States, the greater percentage of them being located north of the Ohio and Potomac Rivers and east of the Mississippi.

THE ASSOCIATION OF SCURVY WITH ORAL DISEASES

By F. C. Cady, *Dental Surgeon, United States Public Health Service*

The history (*1*) of scurvy is so dramatic and spectacular that it deserves some consideration in any discussion of the disease. Scurvy has played a prominent part in all wars from the campaigns of Caesar and the Crusades to the World War of 1914–18. Hippocrates refers to large numbers of men in the army who suffered from pain in the legs and gangrene of the gums. De Joinville, who accompanied the Crusaders in their invasion of Egypt under St. Louis in the middle of the thirteenth century, refers to the livid and spongy condition of the gums and describes how the barber-surgeons were forced to cut away the dead flesh from the teeth to enable the victims to masticate their food.

The colonists in the northern part of America were severely afflicted with scurvy, and the mortality was so high among the French during the rigorous Canadian winters that they frequently debated the wisdom of abandoning the settlement.

Coming to more recent times we find that scurvy occurred extensively during the Crimean War, the American Civil War, the Franco-Prussian War, and the Russo-Japanese War. A Civil War report lists 30,700 cases of scurvy, with 383 deaths. The besieged in Paris during the Franco-Prussian War, and those at Port Arthur during the Russo-Japanese War, are known to have suffered severely from this malady. In the World War scurvy was prevalent in the armies of the East. In Mesopotamia it is credited with being one of the decisive factors in the surrender of the British at Kut-el-amara.

The incidence of scurvy through the centuries has not been limited to the military forces. History records many outbreaks in prisons, asylums, poorhouses, and houses of correction. There is a long list of outbreaks of this disease at sea during the sailing-vessel days when voyages consumed long periods of time and fresh foods were not available. These outbreaks are recorded in history from Vasco

de Gama's voyage to the East Indies via the Cape of Good Hope in 1499 to a British Arctic expedition in 1877.

It is possible, and desirable, to recall here only a few of the more important outbreaks of this scourge. For those who wish further information on the history of scurvy, an excellent review may be found in Hirsh's Handbook of Geographical and Historical Pathology.

Clinically, scurvy is characterized chiefly by ecchymosis, extravasation, and edema of the lower extremities (caused by subperiosteal hemorrhage) and by hemorrhage of the investing soft tissues of the teeth. The degree of the symptoms varies with the severity of the disease. Hemorrhage is the striking manifestation of the disease, and may extend to the organs. Though not completely understood, it is thought by many authorities that the hemorrhage is due to a mechanical weakness of the walls of the capillaries, permitting the mechanical escape of blood. This has been substantiated by the capillary resistance test.

The etiology and symptomatology of scurvy are so well known that no discussion of these subjects will be given here. It is important, however, to emphasize the fact that the essential food element specific for this disease is contained in seasonable foodstuffs of comparatively high cost. Also the antiscorbutic vitamin C, or cevitamic acid, as it is now called, is the most sensitive and least stable of the important vitamins. It is highly sensitive to heat, oxidation, and drying. It is destroyed by ageing, particularly in an alkaline or neutral media. This accounts for its presence in canned tomato juice, which is acid.

The paucity of the antiscorbutic vitamin in ordinary low-priced foodstuffs and its sensitivity to heating, drying, and ageing explain the high incidence of scurvy in armies, on ships at sea, and in institutions which of necessity were required to use prepared foods, since fresh fruits and vegetables were expensive and perishable.

Although modern distribution and preservation of fresh foods have greatly reduced the incidence of severe cases of scurvy in a large part of the modern world, there is increasing evidence to support the conviction that there continues to exist a high rate of subclinical scurvy. This is most evident among the low-income groups.

It must be borne in mind that it takes from 4 to 6 months to produce a case of scurvy with definite clinical symptoms of hemorrhage. This is probably due to the fact that the vitamin C is stored in the body.

O'Hara and Hauck (*2*) demonstrated this by a chemical titration method of urinary analysis. In a number of test cases they showed that the amount of vitamin C necessary to restore the tissues to saturation after 1 month of low intake ranged from 2,200 to 2,800 milligrams.

In 1931, Abassy, Harris, Ray, and Marrack (*3*) also demonstrated vitamin C subnutrition by urinary analysis. They found that, when

the daily excretion of cevitamic acid falls to 10 to 15 milligrams, or when a test dose of 700 mg fails to give a urinary test response the next day, the diet is not providing sufficient vitamin C.

It is logical to believe that there are many people, particularly of the lower income groups, whose diet is below the minimal requirement of antiscorbutic foods. This condition, coupled with the fact that one of the early symptoms of the disease is spongy hemorrhagic gums, would lead one to associate subclinical scurvy with the high rate of gingivitis, stomatitis, and Vincent's infection.

Although sufficient reliable data are not at present available to prove this contention statistically, a well-controlled experiment and a few reports of sporadic outbreaks of oral diseases tend to support the hypothesis.

At the Moose Lodge Orphanage, Mooseheart, Ill., Hanke, in 1930, conducted a nutritional experiment on over 300 children over a period of 2 years (*4*). These children were examined and observed for 1 year on their regular diet, which was found to be adequate in respect to calories of protein, carbohydrate, and fat. At the end of the year, 60.9 percent had gingivitis ranging from mild to severe. At the beginning of the second year this same group was given 1 pint of orange juice and the juice of one lemon daily in addition to their regular diet. All other factors remained the same as those which existed during the control year. At the end of the second year all but 19 percent were found to be normal or greatly improved.

An epidemic of Vincent's infection in the San Luis Valley of Colorado, in 1935, also showed a significant relationship to a possible dietary deficiency (*5*). The San Luis Valley comprises five counties in southwestern Colorado located on a high plateau between two mountain ranges. The altitude is high, the winters are long, and the summers short. The climatic condition is not favorable to the production of fruits and vegetables, and a large percentage of the population is Mexican, of the peon class. Fresh foods are scarce and expensive. A mouth infection occurred among these people of such proportions that the Colorado State Health Department appealed to the Red Cross for assistance. The Red Cross, in cooperation with the Colorado State Dental Society, sent nurses and dentists into the valley to handle the situation. Out of 9,400 examinations, over 3,700 positive cases of Vincent's infection were diagnosed by combined clinical and microscopical examination—a morbidity rate of 40 percent.

The following is an interesting quotation from a report of this outbreak published in the Journal of the American Dental Association by the dentist in charge of the group: "Many were suffering from malnutrition resulting perhaps from lack of dairy products, fresh vegetables, and fruits. About 80 percent of the malnourished were affected. It

seems that a deficiency diet renders one more susceptible to Vincent's infection, and an adequate diet is a great aid in treatment."

McCollum (*6*), Howe (*7*), Mellanby (*8*), and others reported by McCollum (*6*) have produced definite lesions of the dental investing tissues in rats and monkeys with scorbutic diets which closely resembled the degenerative diseases of the human mouth. Conditions which I have found in recent years among the American Indians of the Southwest (*9*) were similar to those found in the San Luis Valley. Belding and Belding (*10*), Hanke (*4*), Kirkpatrick (*11*), and Penta (*12*) noted similar conditions in other groups. In fact, there is increasing evidence that the field for an ever increasing amount of oral disease has been prepared by our ancient and venerable enemy—scurvy.

SUMMARY

1. Epidemics of severe types of scurvy are preventable as the result of a better understanding of the disease and better distribution and preservation of the foods which contain the specific element for prevention.

2. Three important factors are largely responsible for the scarcity of the essential vitamin in the ordinary dietary; namely, instability to heat, drying, and oxidation.

3. The scarcity of foods containing vitamin C in certain seasons and in certain climates and the high cost of these foods support the contention that there probably are many people whose diet does not contain the minimum amount of vitamin C to maintain good health.

4. The high incidence of diseases of the dental investing tissues among the poor, and the fact that these conditions are allied so closely to the symptoms of scurvy lend credence to the opinion that there is an association between subclinical scurvy and gingivitis and Vincent's infection, and that some of these diseases may be superimposed as a secondary invader upon a subclinical gingival scurvy. This contention is supported by group studies and surveys of sections of the population whose diet is low in antiscorbutic foods.

5. There is need for careful epidemiological investigation of Vincent's infection, which has been on the increase since the depression. A careful study of dietary deficiency as it relates to this disease might reveal new factors in its etiology.

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KENTUCKY'S PLAN FOR PUBLIC HEALTH EDUCATION

By A. T. McCormack, M. D., *State Commissioner of Health*, and Reba F. Harris, M. A., *Associate Director, Bureau of Public Health Education, Kentucky State Department of Health*

Since approximately 70 percent of all public health work has its basis in education, it becomes imperative that more time and thought be given to a well-organized plan of public health education. Social Security funds have enabled the Kentucky State Department of Health to set up such a functioning plan.

This plan is based on the point of view that public health is concerned not only with saving lives of human beings, but also with guiding them to learn how to live healthfully and effectively in their daily environments. This guidance becomes more effective with the understanding of the facts that specific health problems arise within certain age groupings, and that health hazards exist under certain environmental conditions. In the infant and preschool period of life, for example, enteritis takes its greatest toll. From the public health approach, it is not only that the disease be attacked, but attention must be given to the guidance of parents as they react to the child and the family in the varied environments in which they live. Such consideration will aid the parents to lead the child safely through this health hazard. Education is the key to this guidance.

Kentucky's new plan of public health education, therefore, is based not upon artificial publicity devices, but upon a better understanding of the health needs of human beings in the various age groupings as they react to each other within the respective environments in which they live. This will be recognized as the ecological approach to public health education.

The first step toward the application of this approach is an efficient corps of public health workers who render all services in an educative way; for, whether it be through emotional appeal or reasoning, the activity or procedure in itself provides the greatest possibility for catching the attention and thereby places the individual or group in a receptive frame of mind for the operation of the learning processes. In other words, a community of both adults and children will understand more readily the values of a safe milk supply if facts concerning its own present supply, and the inherent dangers, are presented for study and discussion at the time the community leaders are planning changes or improvements in such supply. The public health leaders, themselves, must continue to learn about the newer scientific facts concerning a community's milk supply and understand how to interpret its values to individuals and groups. A parent will understand more readily the value of protecting his child from tuberculosis if someone presents to him, in language he can understand, facts concerning the disease, when the examinations and tests for tuberculosis are being given to his child. The person who renders this service must continue to learn the newer information concerning tuberculosis and be able to interpret this information to the parent and child.

That the activities and procedures involved in the generalized program of public health in Kentucky may become forces for education in the lives of her people, the Kentucky plan for public health education, cooperatively formulated by all members of the State Department of Health staff, begins with the continued learning, or in-service education, by the two major groups of people who are actively engaged in public health work: namely, (1) The administrative and staff members of the State Department of Health, and (2) personnel of the cooperating county and city health departments.

Through these two major coordinated groups, the plan extends to the leaders of the organized forces for social betterment and to the public in general within the State and various local communities; for it is that group of workers—public health physicians, public health nurses and sanitary instructors—who are charged with the responsibility of bringing to a greater number of leaders in all phases of social betterment—health, welfare, education, religion, social economics, as well as farm and labor organizations, women's clubs, and bar associations—a better understanding of the values of public health protection.

THE FUNCTIONING PLAN

Three committees, appointed from the staff members of the State department of health by the State health commissioner, have set up procedures for a functioning plan of continued learning by the personnel of the above-named groups. The committees and their functions are as follows:

Committee on Continued Learning by State Staff

The functions of this committee are to—

1. Map out plans, to be given to all staff members, for an annual program of weekly staff conferences. That these conferences may be of educational value, the program is based on the major problems which will be undertaken during the year by the State Department of Health and cooperating county health units. A period of 1 month is assigned to each bureau director. The program for each meeting is formulated around the following general statements concerning the topic or problem for discussion:

(*a*) State specifically the problem to be presented to the group.
(*b*) Give, briefly, any new scientific facts in relation to the cause, diagnosis, prevention and treatment of this specific problem. Suggest, in connection with these facts, any reading references which may be helpful to staff members.
(*c*) Give, briefly, the administrative plan for attacking this problem throughout the State by—
The State department personnel;
County health unit personnel.
(*d*) Indicate what records and reports, which apply to this problem, are being kept by local and State personnel.
(*e*) Explain the plan for educational work concerning this problem that has been set up with the professional public health workers and with allied groups.

The remainder of the meeting is devoted to group discussions and reports of how staff members of other bureaus may participate in any or all phases of the work to carry forward the plan under consideration.

Further functions of this committee on continued learning by State staff are as follows:

2. Organize and set up plans for the use of a professional reference library within the State office building. The nucleus for this library is the best books and pamphlets on all phases of medical science, maternal hygiene, child care, public health nursing, sanitation, etc., which are now located in the various offices of staff members. For additional publications, each member of the staff has agreed to con-

tribute to this library at least one reference book per year, and subscribe to at least one professional periodical, which shall be bound by the State and kept for permanent reference.

3. Organize plans for instructing adequately the visiting public health students, and other out-of-the-State visitors, as to public health administration in Kentucky.

4. Set up policies for State staff members' attendance and reports of meetings of national professional organizations.

Committee on Continued Learning by County Unit Personnel

The functions of this committee are to—

1. Set up policies, and organize, on an annual basis, plans for the meetings of the eight district public health study groups, which meet every 2 months. When mapping out the annual plan, this committee meets with the program chairman of each district and sets up for the year's study three or four outstanding issues, based on age groupings, which shall be undertaken throughout the year by the State and local departments. The program committee of each individual district then builds its annual program around these major groupings, using the members of its own district conference group. The following general policy governs the organization of the 1-day programs for each meeting.

For two hours in the morning, the general meeting, composed of health officers, public health nurses, and sanitary instructors, is devoted largely to three aspects of the problem under discussion, namely,

Newer scientific information;
Records for the evaluation of results;
Public health education aspects.

The afternoon session is divided into three round-table group discussions—health officers, public health nurses, and sanitary instructors. For each of these round tables, a permanent chairman from the State staff is appointed to serve for a year. The round-table groups are organized in advance on the "group-study" plan, and the topics for study and discussion are based on the issue of the general morning meeting.

A mimeographed plan, containing the list of major problems selected for general meetings and group discussions, a statement of policies concerning program making, and the outlined program of each district, together with designated round-table group leaders, is made available to all State and county staff members.

Further functions of the committee on continued learning by county unit personnel are as follows:

2. Organize, on an educational basis, the annual school for health officers, which is held each spring in Louisville.

3. Organize and direct plans for educational scholarships from the Rockefeller Foundation and the Social Security funds for the continued study of health officers, public health nurses, and sanitary instructors.

4. Serve in an advisory capacity to the State university on problems concerning the school of public health.

5. Stimulate and encourage each county health officer to continue staff conferences and set up professional reference libraries within each county health department.

COMMITTEE ON CONTINUED LEARNING BY THE ALLIED GROUPS

The third committee of State department of health staff members works with State leaders of organized allied groups, such as—

Those actively engaged in the field of medical science—private practicing physicians, dentists, nurses.

Those actively engaged in general education—educational leaders, university and college administrators and instructors—public-school administrators.

Those actively engaged in social-welfare work—State leaders in social work.

Those actively engaged in the governmental and economic phases of human welfare—the executive, legislative, and judicial bodies.

Those actively engaged in religious work—ministerial groups—educational leaders.

Those actively engaged voluntarily in civic leadership—civic clubs, parent-teacher associations, farm bureaus, labor organizations and women's clubs.

The functions of this committee are to:

1. Meet with leaders of the various groups and organizations, as the needs arise, to map out plans for encouraging their personnel to study certain phases of public health which may have a direct relation to their work.

2. Make plans for the members in the various groups to publish timely articles on some phase of public health in the house organs or professional publications of their respective groups.

3. Provide leaders for local study groups and speakers for general State meetings.

4. Check all printed matter issued by the State department of health as to its scientific accuracy.

5. Recommend, to groups requesting it, authentic public health reference books for their professional libraries.

Each of the above-named committees works out, on an annual basis, specific plans for each of its functions. These plans are mimeographed and made available to all members of the State staff and to all other groups immediately concerned.

Each committee keeps a progress report of all activities, with an annual evaluation of results accomplished. Such reports are submitted to the State commissioner of health and made available to all staff members.

Each year the plan, with the progress reports of all committees, will be studied by the State commissioner of health and all staff members, and changes made to meet the existing needs.

With the State plan as a nucleus, each of the cooperating county and city health departments will be guided to develop, within their respective areas, a functioning plan of public health education, based on services rendered, to meet the health needs of their communities.

SUMMARY AND EVALUATION OF RESULTS TO DATE

This State-wide plan for public health education, based upon the health needs of the various age groups, and built around the in-service education of the leaders in public health and social betterment, has been in operation in Kentucky for less than 6 months. Of the three committees, the committee on continued learning by county unit personnel is actually functioning. Under the leadership of this committee, the 8 district public health study groups have been meeting regularly. In each of these groups there is marked evidence of growing interest in the general discussions. Papers presented show increased study and reading. A greater variety in ways of presenting the topic is shown through the use of graphs, demonstrations, and visual aids. Round table discussions show an expanding interest in the problems, and a desire on the part of all members for further study and discussion.

The other two committees involved in the plan are collecting data to be used as the basis for their functions.

Since the plan is a flexible one, changes will be made, as experience may indicate, to meet changing situations.

VACCINATION AGAINST BUBONIC PLAGUE IN MADAGASCAR

A recently published report [1] indicates that a vaccine (E. V.) prepared by the Pasteur Institute of Tananarive has been found efficacious in the campaign against bubonic plague in Madagascar. It is stated that the number of cases of plague reported has been reduced during the 3-year vaccination campaign by more than 50 percent, the annual number of cases dropping from 3,605 to 1,376. In 1933, the first year in which the new vaccine was used, 12,000 injections were given, while over 600,000 were reported in the 1936–37 campaign. In certain cantons, 85 to 90 percent of the inhabitants were vaccinated. It is reported that the number stricken with the disease was 5 to 10 times greater in unvaccinated persons than in those vaccinated.

[1] La Journée Industrielle, Sept. 29, 1937.

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DEATHS DURING WEEK ENDED OCT. 9, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 9, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	7, 928	7, 885
Average for 3 prior years	7, 216	
Total deaths, first 40 weeks of year	346, 661	346, 420
Deaths under 1 year of age	465	619
Average for 3 prior years	508	
Deaths under 1 year of age, first 40 weeks of year	22, 300	22, 307
Data from industrial insurance companies:		
Policies in force	69, 936, 909	68, 556, 395
Number of death claims	11, 704	10, 839
Death claims per 1,000 policies in force, annual rate	8. 8	8. 1
Death claims per 1,000 policies, first 40 weeks of year, annual rate	9. 9	9. 9

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers.

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (------) indicate that cases or deaths may have occurred, although none was reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 16, 1937, and Oct. 17, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936
New England States:								
Maine	------	3	------	1	12	------	1	0
New Hampshire	------	------	------	------	15	2	0	0
Vermont	6	------	------	------	5	------	0	0
Massachusetts	1	2	------	------	20	68	2	1
Rhode Island	1	1	------	------	2	1	0	1
Connecticut	7	2	------	3	2	8	1	1
Middle Atlantic States:								
New York	21	17	[1] 8	[1] 13	141	55	8	8
New Jersey	9	17	8	10	62	33	0	0
Pennsylvania	30	24	------	------	341	26	3	4
East North Central States:								
Ohio	65	45	22	29	222	8	4	7
Indiana	18	40	26	22	18	1	2	5
Illinois	35	24	1	10	59	11	5	2
Michigan	33	5	2	2	26	19	2	1
Wisconsin	8	6	25	27	21	10	0	0
West North Central States:								
Minnesota	11	13	1	4	2	10	0	3
Iowa	1	7	------	5	------	3	0	2
Missouri	43	29	39	77	57	1	1	1
North Dakota	1	------	1	------	------	1	0	0
South Dakota	------	1	------	------	------	1	0	1
Nebraska	3	4	------	------	4	1	0	1
Kansas	5	7	2	------	4	1	0	0
South Atlantic States:								
Delaware	2	------	------	------	------	------	0	0
Maryland [3]	7	21	10	10	3	4	3	2
District of Columbia	6	6	1	------	1	3	2	0
Virginia	61	38	------	------	20	6	5	9
West Virginia	35	40	10	19	25	------	2	0
North Carolina [3] [4]	125	149	6	4	60	7	1	1
South Carolina	24	5	114	98	6	1	1	0
Georgia [4]	48	54	------	------	------	------	3	1
Florida	19	3	------	3	7	------	1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 16, 1937, and Oct. 17, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936
East South Central States:								
Kentucky	26	27	1	9	40	2	1	2
Tennessee	26	65	22	18	30	3	3	2
Alabama [4]	43	35	23	26	3		2	2
Mississippi [2]	14	22					1	0
West South Central States:								
Arkansas	38	8	20	27			0	0
Louisiana [4]	23	20	10	6		3	0	1
Oklahoma [5]	24	10	14	49	3	8	0	0
Texas [4]	58	57	210	123	18	3	1	2
Mountain States:								
Montana		1	26	37	22	1	0	0
Idaho	4		8	1	7	67	0	0
Wyoming					3	1	1	0
Colorado	6	8			13	2	0	2
New Mexico	2	8		4	14	21	0	0
Arizona	5	7		34	2		0	2
Utah [2]	3	1	1		48	1	0	0
Pacific States:								
Washington	1		1		6	5	0	0
Oregon		2	13	20	4	7	0	0
California [4]	34	49	24	14	28	16	1	8
Total	932	883	649	705	1,376	422	57	67
First 41 weeks of year	18,651	19,321	278,058	142,935	247,694	270,090	4,605	6,346

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers	
	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936
New England States:								
Maine	8	1	8	15	0	0	9	0
New Hampshire	2	1	2	7	0	0	0	0
Vermont	0	0		2	0	0	0	0
Massachusetts	5	2	65	72	0	0	1	4
Rhode Island	1	0	9	17	0	0	0	0
Connecticut	7	1	23	15	0	0	0	1
Middle Atlantic States:								
New York	20	14	139	153	0	0	22	25
New Jersey	10	0	35	34	0	0	3	3
Pennsylvania	7	8	165	177	0	0	27	43
East North Central States:								
Ohio	18	45	333	185	2	0	22	16
Indiana	3	3	122	59	2	1	8	1
Illinois	16	53	192	177	4	1	24	7
Michigan	13	11	280	164	0	0	13	14
Wisconsin	26	3	84	126	1	1	1	1
West North Central States:								
Minnesota	20	2	46	45	0	10	0	0
Iowa	11	7	63	66	3	8	10	4
Missouri	10	8	153	57	1	0	26	23
North Dakota	0	4	26	19	2	11	1	3
South Dakota	0	0	14	21	0	2	1	1
Nebraska	5	1	9	24	0	1	1	0
Kansas	9	1	89	40	1	3	4	2
South Atlantic States:								
Delaware	0	0	11	4	0	0	1	1
Maryland [2]	2	3	27	39	0	0	4	9
District of Columbia	2	0	8	6	0	0	1	0
Virginia	2	1	35	21	0	0	13	24
West Virginia	1	3	84	30	0	0	9	14
North Carolina [2 4]	3	2	30	38	1	0	6	9
South Carolina	0	5	10	9	0	0	11	6
Georgia [4]	2	9	29	15	0	0	11	28
Florida	1	3	9	2	0	0	3	1

See footnote at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 16, 1937, and Oct. 17, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers	
	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936	Week ended Oct. 16, 1937	Week ended Oct. 17, 1936
East South Central States:								
Kentucky	1	4	55	53	1	0	20	26
Tennessee	3	8	38	65	12	0	24	14
Alabama [4]	2	5	15	33	8	0	5	18
Mississippi [2]	8	4	13	18	9	0	5	7
West South Central States:								
Arkansas	3	9	15	6	0	0	11	7
Louisiana [4]	1	1	8	9	0	0	7	16
Oklahoma [5]	10	0	40	5	0	0	27	26
Texas [4]	21	1	53	20	0	0	41	15
Mountain States:								
Montana	2	0	9	33	13	31	12	2
Idaho	0	3	19	37	5	2	4	1
Wyoming	0	0	5	6	0	1	1	0
Colorado	12	1	16	16	0	5	3	1
New Mexico	2	2	11	14	0	0	14	16
Arizona	2	0	5	7	1	0	3	4
Utah [2]	3	0	38	13	0	0	0	0
Pacific States:								
Washington	4	0	30	39	6	1	2	6
Oregon	3	4	25	15	8	0	0	4
California [4]	25	13	123	149	2	0	9	9
Total	306	246	2,668	2,277	82	78	415	412
First 41 weeks of year	8,433	3,337	177,590	189,903	8,456	6,224	12,636	11,749

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Rocky Mountain spotted fever, week ended Oct. 16, 1937, North Carolina, 1 case.
[4] Typhus fever, week ended Oct. 16, 1937, 48 cases, as follows: North Carolina, 2; Georgia, 21; Alabama, 13; Louisiana, 2; Texas, 9; California, 1.
[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
1937										
New Hampshire:										
January	0	1	21				0	57	0	0
February	0	1	57				0	56	0	0
March	0	1	1				0	88	0	
April	0						0	52	0	0
May	0						0	66	0	1
June	0						0	35	0	3
September 1937										
Alabama	7	116	28	839	9	15	15	63	2	47
Idaho		4	2		4		3	30	15	10
Iowa	2	8	6	2	7		118	133	8	20
New Jersey	4	36	27	7	71		68	103		47
New Mexico	0	14	2	6	18	1	5	23	0	61
North Carolina	7	357	2	313	94	45	12	184	1	64
Wyoming		1			9		16	27	1	4

September 1937

	Cases
Anthrax:	
Iowa	4
Chicken pox:	
Alabama	4
Idaho	9
Iowa	11
New Jersey	73
New Mexico	8
North Carolina	14
Wyoming	8
Conjunctivitis:	
Idaho	1
New Mexico	3
Dysentery:	
Alabama (amoebic)	1
Iowa (bacillary)	3
New Jersey (amoebic)	2
New Mexico (amoebic)	3
New Mexico (bacillary)	114
New Mexico (unspecified)	48
North Carolina (bacillary)	8
Encephalitis, epidemic or lethargic:	
Alabama	2
Iowa	6
German measles:	
Alabama	2
Idaho	4
Iowa	2
New Jersey	26

September 1937—Continued

	Cases
German measels—Contd.	
North Carolina	7
Wyoming	3
Mumps:	
Alabama	30
Idaho	7
Iowa	27
New Jersey	105
New Mexico	4
Wyoming	12
Ophthalmia neonatorum:	
New Jersey	16
North Carolina	2
Paratyphoid fever:	
New Jersey	1
New Mexico	2
North Carolina	2
Puerperal septicemia:	
New Mexico	2
Rabies in animals:	
Alabama	75
New Jersey	6
Rocky Mountain spotted fever:	
New Jersey	1
North Carolina	3
Septic sore throat:	
Idaho	5
Iowa	1
New Mexico	4
North Carolina	12
Wyoming	6

September 1937—Continued

	Cases
Tetanus:	
Alabama	4
New Jersey	1
Trachoma:	
Idaho	8
New Jersey	2
Trichinosis:	
New Jersey	1
Tularaemia:	
Alabama	2
New Mexico	1
Typhus fever:	
Alabama	76
North Carolina	4
Undulant fever:	
Alabama	3
Iowa	11
New Jersey	2
North Carolina	4
Wyoming	1
Vincent's infection:	
Idaho	1
Whooping cough:	
Alabama	95
Idaho	55
Iowa	161
New Jersey	330
New Mexico	50
North Carolina	483
Wyoming	83

PLAGUE INFECTION IN CALIFORNIA

Dr. W. M. Dickie, director of public health of California, under dates of October 7 and October 14, 1937, stated that plague infection had been demonstrated in pools of fleas and in pooled tissue and organs taken from rodents in California as follows

Fresno County.—A pool of 111 fleas from 27 *fisheri* squirrels, 84 fleas from 151 golden mantled squirrels, 48 fleas from 139 chipmunks, and 27 fleas from 10 chickaree (red) squirrels, received at the State department of health laboratory on September 21; a pool of 48 fleas from 139 chipmunks and 11 fleas from 17 chipmunks collected on September 20; a pool of organs from 3 *beecheyi* squirrels shot on September 14; and a pool of organs from 9 golden mantled squirrels collected October 2.

Placer County.—Pooled tissue from 7 *beecheyi* squirrels, 5 chipmunks, 2 wood rats, 2 *alexandrinus* rats, and 3 golden mantled squirrels received at the laboratory on October 1.

WEEKLY REPORTS FROM CITIES

City reports for week ended Oct. 9, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	232	109	22	123	376	645	6	349	79	815	--------
Current week [1]	136	53	13	272	422	595	2	316	57	776	--------
Maine:											
Portland	0	------	0	• 0	0	0	0	1	0	5	19
New Hampshire:											
Concord	0	------	0	6	0	0	0	0	0	0	7
Manchester	0	------	0	0	3	0	0	1	0	0	19
Nashua	0	------	------	0	------	0	0	------	0	0	8
Vermont:											
Barre	0	------	0	4	2	1	0	0	0	0	5
Burlington	0	------	0	0	0	1	0	0	0	0	6
Rutland	0	------	0	0	1	0	0	0	0	1	6
Massachusetts:											
Boston	0	------	0	6	17	17	0	7	2	12	190
Fall River	1	------	0	0	2	0	0	3	0	14	25
Springfield	0	------	0	0	2	3	0	1	0	15	23
Worcester	0	------	0	0	5	0	0	1	0	0	44
Rhode Island:											
Pawtucket	0	------	0	0	0	2	0	0	0	0	11
Providence	0	1	0	0	3	6	0	3	0	15	61
Connecticut:											
Bridgeport	0	------	0	0	2	1	0	1	0	0	22
Hartford	2	------	0	0	2	4	0	1	1	1	39
New Haven	0	------	0	1	5	3	0	0	2	2	42
New York:											
Buffalo	1	------	0	3	14	6	0	0	0	10	127
New York	24	10	3	13	65	30	0	78	15	130	1,403
Rochester	0	2	0	1	7	0	0	2	0	5	72
Syracuse	0	------	0	0	7	1	0	1	0	16	49
New Jersey:											
Camden	1	------	0	0	3	1	0	0	1	0	38
Newark	0	------	0	1	4	4	0	5	1	13	97
Trenton	0	------	0	21	2	1	0	4	0	3	34
Pennsylvania:											
Philadelphia	8	3	1	5	22	33	0	19	6	44	452
Pittsburgh	0	4	0	42	19	21	0	7	0	18	162
Reading	0	------	0	1	2	0	0	0	0	0	26
Scranton	0	------	------	1	------	3	0	------	0	1	--------
Ohio:											
Cincinnati	4	------	0	3	9	20	0	9	2	19	135
Cleveland	0	3	0	31	19	30	0	9	0	28	199
Columbus	2	1	1	1	2	12	0	3	0	4	81
Toledo	0	------	0	0	5	9	0	2	4	15	62
Indiana:											
Anderson	0	------	0	0	2	5	0	0	0	5	8
Fort Wayne	0	------	0	0	3	0	0	3	0	0	22
Indianapolis	1	------	0	1	11	12	0	3	0	7	99
South Bend	0	------	0	0	4	1	0	0	0	0	18
Terre Haute	1	------	0	1	0	3	0	0	0	0	18
Illinois:											
Alton	0	------	0	6	0	2	0	0	0	0	8
Chicago	6	4	0	15	26	46	0	34	1	35	668
Elgin	0	------	0	0	3	1	0	0	0	0	11
Moline	0	------	0	0	1	1	0	0	0	3	14
Springfield	0	------	0	0	2	4	0	0	0	1	19
Michigan:											
Detroit	9	2	2	17	15	62	0	11	2	37	252
Flint	1	------	0	0	3	13	0	0	0	4	20
Grand Rapids	0	------	0	4	2	12	0	1	0	5	36
Wisconsin:											
Kenosha	0	------	0	0	0	1	0	0	0	0	10
Madison	0	------	0	0	0	2	0	0	0	10	19
Milwaukee	0	------	0	14	5	11	0	2	0	45	90
Racine	0	------	0	2	0	3	0	0	0	6	13
Superior	0	------	0	0	0	0	0	0	0	0	10

[1] Figures for Wilmington, N. C., Galveston, Tex., Boise, Idaho, and Los Angeles, Calif., estimated: reports not received.

City reports for week ended Oct. 9, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Minnesota:											
Duluth	0		1	0	0	1	0	3	0	9	26
Minneapolis	1		0	1	0	18	0	1	0	12	90
St. Paul	5		0	1	9	1	0	1	0	4	57
Iowa:											
Cedar Rapids	0			0		0	0		0	0	
Davenport	1			0		0	0		0	0	
Des Moines	0			0		2	0		0	0	34
Sioux City	0			0		6	0		0	11	
Waterloo	0			0		3	0		0	1	
Missouri:											
Kansas City	3		0	0	8	8	0	6	0	0	92
St. Joseph	0		0	0	2	5	0	1	0	0	30
St. Louis	5		0	45	3	40	1	3	1	8	177
North Dakota:											
Fargo	0		1	0	0	1	0	1	0	11	8
Grand Forks	0			0		3	0		0	0	
Minot	0		0	0	0	0	0	0	0	0	9
South Dakota:											
Aberdeen	0			0		0	0		0	1	
Sioux Falls	0		0	0	0	0	0	0	0	0	8
Nebraska:											
Omaha	0		0	0	5	1	0	0	0	0	61
Kansas:											
Lawrence	0	2	0	0	0	0	0	0	0	1	5
Topeka	0		0	0	0	2	0	0	1	1	10
Wichita	0		0	0	1	7	0	0	0	5	20
Delaware:											
Wilmington	0		0	2	2	0	0	0	0	0	26
Maryland:											
Baltimore	3	8	1	2	9	12	0	5	3	61	192
Cumberland	0		0	0	0	2	0	1	0	0	16
Frederick	0		0	0	0	0	0	0	0	0	2
District of Columbia:											
Washington	4		0	1	5	9	0	7	1	3	142
Virginia:											
Lynchburg	2		0	0	0	1	0	1	2	0	6
Norfolk	2		0	1	2	2	0	4	0	0	29
Richmond	0		1	0	6	4	0	1	0	0	53
Roanoke	2		0	0	1	2	0	0	0	3	16
West Virginia:											
Charleston	2		0	0	1	2	0	1	0	0	16
Huntington	2			0		4	0		0	0	
Wheeling	0		0	1	1	2	0	1	0	3	22
North Carolina:											
Gastonia	2			0		0	0		0	0	
Raleigh	0		0	0	0	0	0	0	0	3	8
Wilmington											
Winston-Salem	0		0	0	3	5	0	0	0	8	15
South Carolina:											
Charleston	0	4	0	0	6	2	0	1	1	0	33
Florence	0		0	0	0	0	0	0	0	0	14
Greenville	0		0	0	1	0	0	0	0	0	5
Georgia:											
Atlanta	6	6	0	1	0	17	0	1	1	0	71
Brunswick	0		0	0	1	0	0	0	0	0	3
Savannah	3	1	1	0	2	0	0	1	0	0	29
Florida:											
Miami	0		0	2	5	1	0	1	1	0	41
Tampa	1		0	0	2	0	0	0	0	0	25
Kentucky:											
Covington	1		0	0	5	1	0	0	0	0	19
Lexington	0		0	2	2	0	0	1	0	0	21
Louisville	6	2	0	5	6	17	0	1	1	8	54
Tennessee:											
Knoxville	2		0	0	3	6	0	3	0	0	37
Memphis	4		0	2	1	4	0	6	1	7	69
Nashville	2		0	0	4	2	0	3	1	0	44
Alabama:											
Birmingham	7	2	0	0	6	1	0	1	0	1	75
Mobile	1		0	0	2	1	0	1	0	0	19
Montgomery	1			0		0	0		0	0	
Arkansas:											
Fort Smith	0			0		0	0		0	0	
Little Rock	0		0	0	0	2	0	0	0	0	9

City reports for week ended Oct. 9, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	0	0	0	9
New Orleans	2	1	1	0	7	4	0	7	2	7	131
Shreveport	1	------	0	0	5	2	0	1	1	0	42
Oklahoma:											
Muskogee	1	------	------	0	------	1	0	------	0	0	------
Oklahoma City	0	------	0	0	3	2	0	1	0	0	36
Tulsa	2	------	------	6	------	5	0	------	0	16	------
Texas:											
Dallas	7	------	0	1	3	4	0	5	2	4	64
Fort Worth	1	------	0	0	2	6	0	1	0	4	27
Galveston	------	------	------	------	------	------	------	------	------	------	------
Houston	3	1	0	1	3	6	0	5	2	4	74
San Antonio	1	------	0	1	4	1	0	7	0	1	64
Montana:											
Billings	0	------	0	0	1	0	0	0	0	0	6
Great Falls	0	------	0	0	0	0	0	0	0	0	2
Helena	0	------	0	0	0	1	0	0	0	15	4
Missoula	0	------	0	0	1	0	0	0	0	0	15
Idaho:											
Boise	------	------	------	------	------	------	------	------	------	------	------
Colorado:											
Colorado Springs	0	------	0	0	0	0	0	0	0	0	8
Denver	1	------	0	8	1	6	0	3	0	2	86
Pueblo	1	------	0	0	0	0	1	0	0	2	10
New Mexico:											
Albuquerque	0	------	0	4	0	2	0	3	0	0	12
Utah:											
Salt Lake City	0	------	0	2	2	6	0	1	1	9	37
Washington:											
Seattle	2	------	0	2	2	8	0	5	0	5	89
Spokane	0	------	0	1	1	8	0	0	0	2	36
Tacoma	0	------	0	0	1	2	0	0	0	10	25
Oregon:											
Portland	2	------	1	3	2	1	0	2	0	2	90
Salem	0	1	------	0	------	0	0	------	0	0	------
California:											
Los Angeles	------	------	------	------	------	------	------	------	------	------	------
Sacramento	0	------	0	0	3	0	0	2	0	13	24
San Francisco	1	1	0	1	9	4	0	8	1	27	148

City reports for week ended Oct. 9, 1937—Continued

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	1	0	1
Connecticut:			
Hartford	0	0	1
New Haven	0	0	1
New York:			
Buffalo	2	1	0
New York	2	0	13
Syracuse	0	0	1
New Jersey:			
Newark	0	0	1
Pennsylvania:			
Philadelphia	1	0	3
Pittsburgh	0	0	1
Ohio:			
Cincinnati	0	0	2
Cleveland	1	0	2
Toledo	0	0	1
Indiana:			
South Bend	0	0	1
Illinois:			
Chicago	0	0	8
Michigan:			
Detroit	0	0	3
Flint	0	0	1
Grand Rapids	1	0	1
Wisconsin:			
Milwaukee	0	0	4
Racine	0	0	1
Minnesota:			
Minneapolis	0	0	3
St. Paul	0	0	3
Iowa:			
Des Moines	0	0	3
Missouri:			
Kansas City	0	0	4
St. Louis	0	0	1
Nebraska:			
Omaha	0	0	8
Kansas:			
Topeka	0	0	1
Maryland:			
Baltimore	1	0	2
District of Columbia:			
Washington	0	0	1
South Carolina:			
Charleston	0	0	1
Alabama:			
Mobile	0	1	0
Louisiana:			
New Orleans	0	0	4
Shreveport	0	2	0
Oklahoma:			
Tulsa	0	0	1
Texas:			
Fort Worth	0	0	8
Dallas	0	0	2
Colorado:			
Denver	0	0	2
Pueblo	0	0	[1] 4
New Mexico:			
Albuquerque	0	1	0
Utah:			
Salt Lake City	1	1	0
Washington:			
Seattle	0	0	1
Spokane	0	0	1
Tacoma	1	0	0
Oregon:			
Portland	0	0	1

[1] 2 nonparalytic cases included.

Encephalitis, epidemic or lethargic.—Cases: New York, 1; Trenton, 1; Indianapolis, 1; Sioux City, 1; St. Louis, 26; Louisville, 1; Seattle, 1; Portland, Oreg., 1.

Pellagra.—Cases: Chicago, 1; Winston-Salem, 1; Atlanta, 2; Birmingham, 1; Dallas, 1.

Typhus fever.—Cases: Atlanta, 3; Savannah, 2; Mobile, 1; Houston, 1. Deaths: Houston, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended September 25, 1937.—During the 2 weeks ended September 25, 1937, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis	1		1	2	3					7
Chicken pox				40	42	26	17	3	58	186
Diphtheria		5	3	114	22	4	4		3	155
Dysentery				3	25		19			47
Erysipelas				3	2				2	7
Influenza		10	1		15				4	30
Lethargic encephalitis	1				1					2
Measles		10	1	133	74	18	43	6	131	416
Mumps					52	5	6	2	11	76
Paratyphoid fever		1			6					7
Pneumonia	1				10		1		21	33
Poliomyelitis	1	6	50	40	541	85	130	28	4	885
Scarlet fever		6	17	101	96	21	41	13	27	322
Trachoma						1			1	2
Tuberculosis	2	11	20	139	81	1			19	273
Typhoid fever		5	21	120	20	4	34		6	210
Undulant fever					2	1	2			5
Whooping cough				269	202	85	36	5	27	624

NOTE.—No report was received from Alberta for the week ended Sept. 25, 1937.

JAMAICA

Communicable diseases—4 weeks ended October 2, 1937.—During the 4 weeks ended October 2, 1937, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chicken pox		35	Puerperal sepsis		1
Diphtheria	1		Scarlet fever		2
Dysentery	4	2	Tuberculosis	35	87
Erysipelas		1	Typhoid fever	8	57
Leprosy		2			

VIRGIN ISLANDS

Notifiable diseases—July–September 1937.—During the months of July, August, and September 1937, cases of certain notifiable diseases were reported in the Virgin Islands as follows:

Disease	July	August	September	Disease	July	August	September
Chicken pox		1	1	Pneumonia	1	2	5
Dengue	8		3	Schistosomiasis		1	
Diphtheria	2			Sprue		1	
Gonorrhea	6	15	7	Syphilis	8	17	18
Hookworm disease	4	6	3	Tetanus		1	
Leprosy	1		1	Tuberculosis	4	3	1
Malaria	42	16	9				

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	May 30–June 26, 1937	Week ended—												
						July 1937					August 1937				September 1937			
						3	10	17	24	31	7	14	21	28	4	11	18	25
China:																		
Canton	C								22	40	32	48						
Hoihow	C							100										
Hong Kong	C									7	21	136	433	374	203	205	106	88
	D									7	19	82	177	219	126	116	66	38
Kwangchow Wan	C										7	45	52					
	D											34	47					
Macao	C											35	108	143	64	72	38	16
Shanghai	C													8	29	394	726	655
Swatow	C												4	4	8			
Dutch East Indies—Celebes	C																	6
Federated Malay States	C					2												
India	C	13,015	17,023	14,149	11,113	2,007	2,503	2,633	3,122	3,628	4,119	5,003	4,137	5,000				
	D	6,488	8,324	7,366	5,454	1,019	1,186	1,196	1,410	1,684	1,891	2,123	1,774	2,188				
Assam	C	394	1,823	2,554	435	13	21	14	9	6		8	3	24	18		11	
	D	161	728	1,205	274	7	8	12	5	2		6	2	15	6		1	
Bassein	C	37	86	97	6				1									
Bombay Presidency	C	98	557	3,259	1,713	288	406	474	840		1,281				1,143			
	D	84	237	1,457	674	122	136	180	304		580				467			
Bombay	C		[1] 1	[1] 2				[1] 1							[1] 1			
Calcutta	C	106	247	732	173	13	17	21	26	15		18	19	18	14	10	13	
Central Provinces and Berar	C	4	5	83	318	16	22	13		11	32	45	44	55	85		59	
Chittagong	C	3	13	143	34	[1] 1	3		[1] 1									
Madras Presidency	C	3,186	3,270	1,839	1,048	332	449	605	680	728	869	1,139	1,139	1,063				
	D	1,559	1,855	1,103	544	159	183	260	273	817	369	464	427	399				
Madras	C	5	5	1	6			1	1	14		7	16	24	20	25	25	
	D	1	1		3				1	5		5	9	8	5	6	7	
Negapatam	C	2		2	20								1			1	2	
	D				12	1											1	
Northwest Frontier Province	C											100	92	11			31	
Orissa Province	C	602	368	181	188	62	56	59	60	58	42	71	67	67				51

[1] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

CHOLERA—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	May 30–June 26, 1937	Week ended— July 1937					August 1937				September 1937			
						3	10	17	24	31	7	14	21	28	4	11	18	25
India—Continued.																		
Punjab	C	1	2	3	16	6	10	4		4	17	19	46	38	16	6	1	6
Rangoon	C	3	6	12	7													
Sind State	C			1								1			1			
Tuticorin	C			2	10													
India (French):																		
Chandernagor Territory	C	3	5	8	2	1	1											
Karikal Province	C	3																
Pondichery Province	C	1		1														
Indochina (see also table below): Cochinchina—																		
Chaudoc	C	P																
Cholon Province	C		P															
Haiphong	C																	56
Tonkin Province	C																	320
Japan:[3]																		
Amagasaki.[3]																		
Hiroshima	C																	32
Kobe.[3]																		
Okayama Prefecture.[3]																		
Taku[3]	C																1	
Tokuyama.[3]																		
Tokyo.[3]																		
Philippine Islands: **Manila**	C		1															
	D		1															
Siam:																		
Bangkok	C	226	948	338	28		1	1	2	1	1							
Provinces	C	1,455	1,646	796	255	36	55	35	18	7	12	16	10	4	8	5		3
Straits Settlements: **Penang**	C				1													
On vessels:																		
S. S. *Kedah* at Singapore from Penang	C		1															
S. S. *Hellas* at Bangkok from Swatow	C		3															
	D		2															
S. S. *Kedah* at Belawan-Deli	C		1															

[3] Cholera has also been reported in Japan as follows: Week ended Oct. 2, Amagasaki, 1 case; Kobe, 1 case. Week ended Oct. 9, Okayama Prefecture, 1 case; Taku, 3 cases; Tokuyama, 10 cases; Tokyo, 1 case.

S. S. *Ellenga* at Penang from Negapatam	C				15													
	D				9													
S. S. *Aronda* at Rangoon from Calcutta	C				1													
S. S. *Badahur* at Rangoon from Calcutta	C				1													
S. S. *Talamba* at Port Swettenham from Madras	C					2												
S. S. *Chungking* at Bangkok from Hoihow	C							1										
S. S. *Hiangsu* [3] at Singapore from Hong Kong	C								1									
S. S. *Kwantung* at Hong Kong from Hoihow	C								1									
S. S. *Eagle* at Hong Kong from Kongmoon	C									1								
S. S. *Muinam* at Singapore from Hong Kong	C												2					
	D												1					
S. S. *Sandviken* at Hong Kong	C												P					
S. S. *Haiching* at Hong Kong	C												P					
S. S. *Talma* at Singapore from Hong Kong	C												1					
S. S. *Cremer* at Singapore from Amoy, Hong Kong and Swatow	C													1				
S. S. *Tyndareus* at Kobe from Hong Kong and Dairen	C													1				
S. S. *Manila Maru* at Moji from Hong Kong	C														1			
S. S. *Anking* at Singapore from Hong Kong	C															1		
S. S. *Sphinx* at Singapore from Hong Kong	C																1	

Place		December 1936			January 1937			February 1937			March 1937			April 1937			May 1-10, 1937
		1-10	11-20	21-31	1-10	11-20	21-31	1-10	11-20	21-28	1-10	11-20	21-31	1-10	11-20	21-30	
Indochina (French) (see also table above):																	
Cambodia [4]	C	1									2	6			2		3
	D	1									2	6			2		1
Cochinchina [4]	C		1				1				2				1		
	D		1				1				2				1		

[3] In addition for week ended July 28, 3 cases with 2 deaths in contacts

[4] Reports incomplete.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE[1]

[C indicates cases; D, deaths; P, present]

Place		Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	May 30–June 26, 1937	Week ended— July 1937: 3	10	17	24	31	August 1937: 7	14	21	28	September 1937: 4	11	18	25
Algeria: Algiers	C						[2] 1											
Argentina. (See table below.)																		
Bolivia. (See table below.)																		
British East Africa:																		
Kenya	C	4	5	7	24	18	7	10	2	5	4	5		7	4	3	3	
Tanganyika	C	10	29	11	6						1							
Uganda	C	41	24	48	39	8	16	6	10	7	4	10	8	10	6	5	26	
	D	35	22	43	38	8	14	6	8	7	4	10	8	10	6	5	26	
Ceylon:																		
Central Province—Nuwara Eliya District	C				1													
Chilaw District	C			1														
Colombo	C	6		2	2									1				
	D	6		2	2									1				
Plague-infected rats		3	2	1	3	1				1							2	
China:[3]																		
Amoy	C		2															
Fukien Province[3]	D		130															
Hainan Island	C	P																
Hsiatangchi.[3]																		
Manchuria.[3]																		
Dahomey. (See table below.)																		
Dutch East Indies:																		
Java and Madura	C	433	279	260	205	47	46	41										
	D	443	255	255	205	47	46	39										
Java—Batavia	C		1															
Pasoeroean	C								1									
Ecuador (see also table below):																		
Guayaquil	C	33	17	8	4								1					
	D	24	16	3	3	1							1					
Plague-infected rats		33	37	27	13		1			1		2			1			
Egypt:																		
Asyut Province	C	2	48	9	1													
Dakahliya Province	C		1															
Girga Province	C	1	1	3	1													

Hawaii Territory: Plague-infected rats																		
Hawaii Island—Hamakua District:																		
Hamakua Mill Sector [4]		1										5	2	1	3			1
Honokaa Sector									1	2								
Paauhau Sector		5	4	4	7		1							1	1			
Pohakea		1																
Maui Island—Makawao District—Omaopio															1			
India	C	[illegible]	[illegible]	[illegible]	[illegible]	58	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	232	187	331				
	D	2,976	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	21	119	166				
Bassein	C	5	8	7	[illegible]			1				2						
Plague-infected rats		2	2	2	[illegible]					1								
Bombay Presidency	C	8	[illegible]	[illegible]	24	[illegible]	[illegible]	1	11		[illegible]	7	17	11				
	D	[illegible]	[illegible]	16	9	3	2	[illegible]	[illegible]		9	4	7	[illegible]				
Central Provinces and Berar	C	2,213	[illegible]	[illegible]	7		[illegible]					8	33	42	35		59	
Cochin	C																2	
Karachi	C	3	5	1											4	4	4	
Plague-infected rats			1															
Madras Presidency	C	57	[illegible]	[illegible]	[illegible]	6	22	24	27	27	[illegible]	[illegible]	[illegible]					
	D	[illegible]	[illegible]	12	3	7	9	14	[illegible]	11	24	24	[illegible]					
Punjab	C	1	1	2								17						
Rangoon	C	1	3	2			[5] 1		[5] 1			2	3					
Sind State	C	4	6	2											4	4		
Indochina (see also table below):																		
Phnom-Penh	C				1													
Sadec	C						1									1		
Madagascar. (See table below.)																		
Malta	C		1	4														
Peru. (See table below.)																		
Senegal:																		
Dakar	C		1		1		1											
Thies	C			2	4													
Tivaouane	C			1			1											
Syria: Ras el Ain region	D				[6] 12													
Tunisia: Tunis	C			1				1	1									
Plague-infected rats			17	5			1											
Union of South Africa (see also table below)	C	3	[7] 1													[7] 1		

[1] Including plague in the United States and its possessions.
[2] Suspected.
[3] Plague has been reported in China as follows: Information dated Aug. 18 reports an outbreak in West Hsingan (Khingan) and Southern Lungkiang Provinces. Under date of June [illegible], estimated deaths from plague in Fukien Province reported to be 3,000 to 4,000. According to a report dated May 10 several hundred deaths from bubonic plague occurred in Hsiatangchi. Information dated Sept. 2 states that 1[illegible] cases and 105 deaths occurred in Manchuria, China.
[4] Plague has also been reported in Hawaii Territory, Island of Hawaii, Hamakua District, as follows: Week ended Aug. 14, 1 lot of 5 rats and 1 lot of 3 mice, by mass innoculation, and week ended Oct. 9, 1 plague-infected rat, all in Hamakua Mill Sector.
[5] Imported.
[6] Pneumonic plague.
[7] For 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases, D, deaths; P, present]

Place	Feb 28–Mar. 27, 1937	Mar. 28–Apr 24, 1937	Apr 25–May 29, 1937	May 30–June 26, 1937	Week ended— July 1937: 3	10	17	24	31	August 1937: 7	14	21	28	September 1937: 4	11	18	25
United States: [8]																	
California: [8, 9]																	
Fresno County C														1			
Placer County [5]—Plague-infected fleas.																	
San Bernardino County—Plague-infected fleas.																	
San Mateo County—Plague-infected fleas, lice, and ticks																	
Idaho: [8] Bannock County—Plague-infected ground squirrels				([illegible])													
Montana:																	
Beaverhead County—Plague-infected ground squirrel								1									
Madison County—Plague-infected squirrels												1	1				
Nevada: [5]																	
Douglas County C				1													
Ormsby County—Plague-infected fleas and lice.																	
Oregon: [5]																	
Grant County—Plague-infected ground squirrel			1														
Lake County—Plague-infected fleas																	
Wallowa County—Plague-infected ground squirrels			1	1													
Utah: [8]																	
Morgan County—Plague-infected fleas.																	
Wasatch County—Plague-infected ground squirrels												1					
Washington: [8] Adams County—Plague-infected fleas and lice.																	
On vessel: S. S. *Magister* at Kingston from Maranhao, Para, and Manaos C	1																

Place		March 1937	April 1937	May 1937	June 1937	July 1937	August 1937
Argentina:							
Cordoba Province	C	1					
Mendoza Province	C					[10] 9	
Salta Province	C						[11] 1
Santiago del Estero Province	C					[10] 6	
Bolivia:							
Chuquisaca Department	C		[11] 2				
La Paz Department	C			[11] 2	[11] 2		
Oruro Department	C		[11] 1				
Potosi Department	C	[10] 3	[11] 1				
Dahomey	C				1		
Ecuador (see also table above):							
Manabi:							
Bahia	C	7	2				
Manta	C	12	13				
Indochina (see also table above):							
Cambodia	C	1	4	4	4	2	
Cochinchina	C					2	
Madagascar (central region)	C		57	45	23	25	
	D		57	43	22	24	
Peru	C	28	9	12	4	7	3
Cajamarca Department	C	1					
Huancabamba Department	C		3				
Lambayeque Department	C		1	1	1	1	2
Libertad Department	C	12	4	3	2	4	1
Salaverry	C					3	
Lima Department	C	1	1	2	1	2	
Piura Department	C	14		6			
Union of South Africa (see also table above)	C	3	1				

[8] Plague infection proved in insect hosts as follows: *California*—Placer County, June 22–Aug. 31. San Bernardino County, July 12–Sept. 8; San Mateo County, July 1937. *Idaho*—Bannock County, July 8. *Nevada*—Douglas County, July 28, 31, Ormsby County, July 2, Aug. 20. *Oregon*—Lake County, May 7, Wallowa County, June 25. *Utah*—Morgan County, reported Aug. 10. *Washington*—Adams County, Apr. 29, 1937.

[9] Week ended Oct. 9 plague infection proved in pooled tissue from squirrels, chipmunks, and rats from Lake Tahoe region, Placer County.

[10] Number unspecified.

[11] Pneumonic plague.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases, D, deaths; P, present]

Place		Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Apr 25–May 29, 1937	May 30–June 26, 1937	Week ended— July 1937 3	10	17	24	31	August 1937 7	14	21	28	September 1937 4	11	18	25
Algeria:																		
Algiers Department	C			1	2													
Oran Department	C	2		3	1													
Southern Territories	C		2															
Angola. (See table below.)																		
Belgian Congo (See table below.)																		
Bolivia. (See table below.)																		
Brazil:																		
Bahia (alastrim)	C	6	15	10	2	2	1	2	4	7	4	4	2		1	4		
Porto Alegre (alastrim)	D		3	1	1		1			1	2							
Recife (alastrim)	C	3	1															
British East Africa:																		
Kenya	C			1						116								
Tanganyika	C	55	72	93	57	65					131		52	3	76		44	
Canada:																		
Alberta	C		[1] 1		[1] 1	[1] 1		[1] 3		[1] 1								
Manitoba	C	[1] 1																
Saskatchewan	C													[1] 1				
China:																		
Amoy	C	3	2	1	1													
Canton	C	3	4	2														
Dairen	C	4	8	2	5	1				1	1			1				
Foochow	C	P	P	P	P	P		P		P		P		P				
Hangchow	C	1	3	1			1											
Hankow	C	8	11	11	4													
Hong Kong	C	7	32	16	7	1		2		6	3	2	76	1				
Macao	C	2																
Nanking	C	7	3	1	4													
Shanghai	C	96	55	54	18	10	8	2	8	1	1		1		1			
Swatow	C	3	4	5	2													
Tientsin	C	5	3	7	4													
Chosen. (See table below.)																		
Colombia (see also table below): Barranquilla	D	2	1		2				1									
Dahomey. (See table below.)																		
Ecuador: Guayaquil	C	73	34	31	48	4	13	9	4	7	6	2	7	5		1	2	

Egypt:																		
Port Said	C		4		1					1								
Qena Province	C	1																
Eritrea	C	103	4	1	3			2										
Estonia	C		2															
France. (See table below.)																		
Gambia:																		
Bathurst	C	²4																
MacCarthy Island	C	4																
Great Britain: England and Wales—																		
Derby	C	2																
Ripley	C	1																
Greece: Salonika	C	18	30	37	5		12	12										
Guatemala. (See table below.)																		
Honduras: Puerto Castilla	C		1															
India	C	12,592	12,022	10,906	9,247	1,561	1,274	1,4[illegible]	1,178	996	962	824	576	664				
	D	3,065	2,557	2,689	2,725	442	474	398	337	264	313	256	172	169				
Assam	C	163	214	384	278	15	25	15	31	21	21	33	16	28	14		12	
Bombay Presidency	C	782	1,147	1,178	736	62	68	102	79		39				50			
	D	126	198	228	120	35	19	15	17		17				14			
Bombay	C	63	176	165	165	27	22	27	15	13		7	8	13	4	10	20	
	D	48	68	105	72	19	16	16	7	11		7	3	8	4	3	7	
Calcutta	C	87	57	106	21	2	4	5		3	22	2	6	10	10	4	7	
	D	68	51	47	19	2	2	3		3	2	3	3	8	6	2	5	
Central Provinces and Berar	C	341	565	452	212	17	42	35	22	37	33	5			5		3	
Chittagong	C	55	12	1	²2	1	1											
Cochin	C		47	3														
Delhi	C							2	7	3	4	2		1				
Karachi	C	40	28	19	5	1	1								²2			
Madras Presidency	C	632	569	453	130	69	81	103	106	103	100	118	100	97				
	D	118	89	98	31	18	24	24	29	12	29	25	16	25				
Madras	C	24	24	49	43	19	14	14	27	21		26	38	38	27	14	21	
Moulmein	C	48	8		²1													
Northwest Frontier Province	C	55	49	30	46	32	73	74	9	23	12	25			8		17	
Orissa Province	C	848	716	618	477	77	131	74	114	66	93	63		62				65
Punjab	C	552	400	513	674	174	140	90	64	92	57			51				31
Rangoon	C	5	9	3	1							²1						
Sind State	C	143	263	188	254	65	41	75	56	42	86	43			30		17	
Vizagapatam	C	1																
India (French). Chandernagor Territory	C	2																
Indochina (see also table below).																		
Pnom-Penh	C		1	1	1													
Saigon-Cholon	C									1								
Tourane	C	4	3															
Iran	C		2		2									3				
Teheran	C	2		1								1						
Iraq	C		14	2				1		1	4			1				
Baghdad	C			1														

¹ For 2 weeks.
² Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases. D, deaths, P, present]

Place		Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	May 30–June 26, 1937	Week ended— July 1937: 3	10	17	24	31	August 1937: 7	14	21	28	September 1937: 4	11	18	25
Italian Somaliland	C							1										
Japan:																		
Kobe	C	[1] 1																
Moji	C	1	10	3														
Osaka	C				[1] 1													
Yokohama	C		1															
Mexico (see also table below):																		
Chihuahua	C						1											
Ciudad Juarez	D							1										
Durango	D	10	8	5	4					1								
Guadalajara	D		1	2	1													
Mazatlan	C				1	1												
Mexico, D. F.	C	4	10	36			[illegible]		3	1	2		2	4	1	1		
Monterrey	C	1	3	1				1				1					2	
San Luis Potosi	D			1														
Torreon	C	1	11	22	12	3	4					1	1	1		1		
Morocco. (See table below.)																		
Nigeria	C	406	18[illegible]	281	111		84	121		24								
Lagos	C		1															
Nyasaland. (See table below.)																		
Portugal (see also table below):																		
Lisbon	C	2	1	1	6	5			1					1	1	1	3	
Oporto	C				1	1									1	1		
Salvador. (See table below.)																		
Senegal. (See table below.)																		
Siam: Tak Province	C	1	7		3	1			2			1						
Sierra Leone	C			2	1							5						
Southern Rhodesia	C		1															
Sudan (Anglo-Egyptian)	C	12	2	[illegible]	[illegible]	[illegible]			2		2		3	1	2	2	13	10
Tunisia	C				4													
Turkey. (See table below.)																		
Unfederated Malay States: Kedah	C								P									
Uruguay	C				3													

On vessels:
- S. S. *Nagasaki Maru* at Nagasaki from Shanghai .... 1 case ... Mar 8, 1937
- S. S. *Kiangsu* at Swatow from Bangkok .... 1 case ... Mar 13, 1937
- S. S. *Sumatra* at Calcutta .... 2 cases ... Mar 21, 1937
- S. S. *Englestan* at Rangoon from Chittagong .... 1 case ... Mar 25, 1937
- S. S. *Dariken* at Hong Kong .... 1 case ... Mar 31, 1937
- S. S. *Talma* at Hong Kong .... 1 case ... Apr 1, 1937
- S. S. *Jalagopal* at Rangoon from Chittagong .... 1 case ... Apr 2, 1937
- S. S. *Taksang* at Hong Kong .... 1 case ... Apr 13, 1937

On vessels—Continued [3]
- S. S. *President Hoover* at Yokohama from Honolulu .... 1 case ... Apr. 17, 1937
- S. S. *Hydri* at Karachi .... 1 case ... Apr. 24, 1937
- S. S. *G. G. Pasquier* at Singapore from Saigon .... 1 case ... May 7, 1937
- S. S. *Changte* at Thursday Island .... 1 case ... June 26, 1937
- S. S. *Empress of Japan* at Kobe from Manila .... 1 case ... Aug. 11, 1937
- S. S. *Northern Prince* at New York from Rio de Janeiro .... 1 case ... Aug. 19, 1937
- S. S. *Empress of Asia* at Honolulu .... 1 case ... Sept. 5, 1937

Place		March 1937	April 1937	May 1937	June 1937	July 1937	August 1937
Angola	C	9					
Belgian Congo	C	283	143	287			
Bolivia	C	5	25	48			
China: Manchuria—Harbin	C	3	11	4		1	
Chosen	C	58	73	27	1		
Colombia (see also table above)	C	42	89	51	108		
Dahomey	C	5	2				
France	C	1	1	1			
Guatemala	C				2		1
Indochina (see also table above)	C	505	316	271	273	143	227
	D	97	46	95	50	30	6
Mexico (see also table above):							
Aguascalientes State—Aguascalientes	C		1	1			
Chihuahua State	C		1	2			
Colima State	C		4				
Jalisco State—Guadalajara	C		1		1		

Place		March 1937	April 1937	May 1937	June 1937	July 1937	August 1937
Mexico—Continued.							
Mexico State	C	1		1			
Mexico, D. F.	C	16	13	41	28	18	
Mexico City	D					3	
Nuevo Leon State—Monterrey	C					1	
Queretaro State	C	3	1	10	8		
San Luis Potosi State—San Luis Potosi	C		1		1		
Yucatan State	C					1	
Morocco	C		6	1	1	4	
Nyasaland	C		3				
Portugal (see also table above)	C	27	15	29			
	D	2	5	1			
Salvador	C		4				
Senegal	C		29	28	36		
Turkey	C		15	4	1		

[3] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	Week ended— June 1937 5	June 12	June 19	June 26	July 1937 3	July 10	July 17	July 24	July 31	August 1937 7	Aug. 14	Aug. 21	Aug. 28	September 1937 4	Sept. 11	Sept. 18
Algeria:																				
Algiers Department	C	84	96	78	2	27	47	3	15	8	34		[1] 140	4	6	13	7	6	1	
Algiers	C	3	4	4		1	1		1	5	5		[1] 62	2			1			
Constantine Department	C	225	348	417	115		68	33	65	46	23		[1] 69	16	52	9	6	13	3	
Bone	C	3	4	6	11						3		[1] 12	4						
Constantine	C										3		[1] 19	7						
Philippeville	C	1		1									[1] 1							
Oran Department	C	72	24	10	8	9	9		4		6		[1] 6	6		1		4		
Southern Territories	C	[2] 2	1	2	1	5	3		3	1							1			
Arabia: Aden	C	1																		
Australia: Sydney	C	1		1																
Bolivia. (See table below.)																				
Chile	C	175	154	253				[2] 272	34	61	56	72	50							
Concepcion Province	C	20	14	3		1			3	12	1	12	4							
Iquique	C			1		2														
Santiago Province	C	69	58	113	28	33	31	19	17	23	35	34	28							
Valparaiso	C	37	39	71	30	22	29	24	17	6	13		14	14	8	15	10	6	2	4
China (see also table below):																				
Hankow	C					1						1			1					
Nanking	C			4																
Shanghai	C	1		4	1	2	1		5									2		
Swatow	C								1	2										
Tientsin	C	1	1	2	1	1	1	3		1							1		1	
Tsingtao	C		1	12					1											
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C	5	5	20	4	1				1	1		4	4	5	3	1	1	1	1
Aswan Province	C	7	5	6																
Asyut Province	C	5			5				1	1	2		2	2						
Beheira Province	C	18	53	74	14				10	7	5		1	1						
Beni-Suef Province	C			1																
Cairo	C	11	14	17	1															1
Dakahliya Province	C	15	38	74	15				14	10	6		1	3						
Damietta Province	C				1	1														
Faiyum Province	C										1									
Gharbiya Province	C	12	59	135	55				17	19	1		4							
Girga Province	C			1	2				1	1										

Minufiya Province	C	6	11	2[illegible]	4					1			3							
Minya Province	C			2										1						
Port Said	C						1		1	1										
Qena Province	C		14	33	3															
Sharkiya Province	C	1	2	11	3					1										
Suez	C						1					1	1					1	1	
Provinces	C	123	243	709	106	29	85	57	45	40	17	15	13	14	6	6	11	9		
Eritrea: Asmara	C		6	4	1	1					1									
Finland. (See table below.)																				
Greece. (See table below.)																				
Guatemala. (See table below.)																				
Hawaii Territory: **Honolulu**	C	1	1						1		1	2					1			2
Hungary	C	12		1					1											
Iran	C	[1] 1	7	14	15	1		9												1
Teheran	C			1	1															
Iraq:																				
Baghdad	C		[2] 5					1	1		1									
Diwaniyeh Province	C			6																
Kirkuk Province	C	12	8	3	2	4	6		2											
Kut Province	C		1																	
Irish Free State: Kerry County—Cahirciveen	C		4																	
Latvia. (See table below.)																				
Libya. (See table below.)																				
Lithuania. (See table below.)																				
Mexico (see also table below):																				
Mexico, D. F.	C	11	13	18								2		5	6	5	11	4	11	
San Luis Potosi	D					1														
Torreon	C		1																	
Morocco (see also table below)	C	24	120	352	49	50	38	37	31	15	13	19	7	7	3	9	2	6	7	8
Casablanca	C				200				2				3	3	2					
Palestine:																				
Haifa	C	1	1	6		1				2		1		1		2	1	4	3	4
Jaffa	C	2	4	6		2	1		1		2			1	4	1	3	4	5	
Panama Canal Zone. (See table below.)																				
Poland	C	462	629	805	106	76	66	39	30	15	15	13	10	13	19	6	5	5	6	8
	D	33	40	43	5	9	4	2			1			3	1					
Rumania. (See table below.)																				
Sierra Leone. **Freetown**	C			2																
Straits Settlements: **Singapore**	C						1													
Switzerland. Zurich	C									1										
Syria	C		1																	
Trans-Jordan	C	1	3	5						1										
Tunisia:																				
Tunis	C	4	4	29	3	9	2	[illegible]	1	1	1		1	2	6	1	1	5	1	1
Provinces	C	550	428	665	93	188	139	126	87	97	106		47	57	80	59	20	12	14	
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				
On vessel: At Santos	C	P																		

[1] For 2 weeks.

[2] Imported.

[3] For 4 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, Deaths; P, present]

Place		March 1937	April 1937	May 1937	June 1937	July 1937	August 1937
Bolivia	C	30	48	39	35		
China: Manchuria—Harbin	C	58	45	29	35	14	8
Chosen	C	154	147	99	85		
Czechoslovakia	C	33	25	3			
Finland	C		1		1		
Greece	C	4	2	1	11	5	
Guatemala	C	4	13	12	8	16	10
Latvia	C	1	1				
Libya	C			13	34	10	
Lithuania	C	23	37	6	2	7	
Mexico (see also table above)							
Aguascalientes State. Aguascalientes	C	1	1	2			
Guanajuato State	C	2		4		3	
Hidalgo State	C		5	1	2		
Jalisco State—Guadalajara	D	1					
Mexico State	C	1		2		14	
	D	1					
Mexico—Continued.							
Mexico, D. F.	C	12	16	14	14	16	
Mexico City	D					5	
Queretaro State	C	1	1	2	2		
San Luis Potosi State: San Luis Potosi	C	2	2	2			
Morocco (see also table above)	C	27	190	283	182	89	25
Panama Canal Zone	C			2			
Rumania	C	917	832	557	177	61	
Turkey	C	68	39	155	72	30	7
Istanbul	C		3		3	2	
Union of South Africa.							
Cape Province	C	38	41	35	12	50	
Natal	C	1		7	13		
Orange Free State	C	5	3	27	35	11	
Transvaal	C	2		1	3	13	

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Feb. 28–Mar. 27, 1937	Mar. 28–Apr. 24, 1937	Apr. 25–May 22, 1937	Week ended—																	
					June 1937				July 1937					August 1937				September 1937				Oct. 2, 1937
					5	12	19	26	3	10	17	24	31	7	14	21	28	4	11	18	25	
Brazil:																						
Matto Grosso State [1]	C	1	4	2																		
	D	3		4					1													
Minas Geraes State [1]	D	31	13	1																		
Para State [1]	D		1						2	1	1		2			1						
Piauhy State	D				1																	
São Paulo State [1]	D	38	16																			
Colombia:																						
Boyaca Department	C			1			1		2							1						
	D	1		3							2	2				1	1					
Caldas Department	D																			1		
Cundinamarca Department	D				1		1				1			1	1				1			
Intendencia of Meta—Villavicencio	D	1	3																			
Santander Department	C																	2				
	D		2	2					1					2			2			4	2	
Dahomey, Bohicon	C							1														
French Equatorial Africa:																						
Bangui	D																			1		
Brazzaville	D		1																			
Fort Archambault	C																			[2] 2		
Libreville	C	1											1									
	D												1									
Gold Coast [3]	C	1		4		6	3	2	5		10	2	6	6	2		1		3			1
	D			1		6	2	2	4		10	2	3	4					2			1
Accra	C						1	1	1		1						1		[2] 1			
Nugo	C			1																		
Ivory Coast:																						
Agboville	C	1													1							
Gaoua	C																		2			
	D																		1	[2] 1		
Touba [4]	D																				[2] 1	

[1] See also reports of yellow fever in Brazil on pp. 463, 536, 657, 683, 762, 815, 912, 1134, and 1248 of the PUBLIC HEALTH REPORTS.
[2] Suspected.
[3] During the week ended Oct. 9, 1937, 1 case of yellow fever was reported in Asubon, Gold Coast.
[4] For the week ended Oct. 9, 1937, 1 suspected case of yellow fever was reported in Touba, Ivory Coast.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Feb 26–Mar 27, 1937	Mar 28–Apr 24, 1937	Apr 25–May 29, 1937	Week ended— June 1937: 5	12	19	26	July 1937: 3	10	17	24	31	August 1937: 7	14	21	28	September 1937: 4	11	18	25	Oct. 2, 1937
Nigeria:																						
Aba	C															1						
Abeokuta	C																		1			
Farcados	C											1										
Ibadan	C												1									
Jos.[4]																						
Ogbomosho	C								3	1		1										
	D								1			1										
Ovim	C												1									
	D														3							
Sapele	C																1					
Paraguay[6]	C									P.												
Peru: Perene region (Pampa Whaley)	C		23																			
	D		8																			
Senegal:																						
Bambey	C							1														
Dakar	C			[7] 1																		
Diakhao	C	1		1																		
Diourbel	D															1						
Gossas[8]	C																1				1	
Malem Hodar	C			1																		
Rufisque	C																					1
Tamba-Counda	C															[7] 1						
Thies Circle—Khombole	C		1																			
Tilmaka	C		1	1																		
Tivaouane	C		1																			
Sudan (French): Mahina	C			[7] 1																		

[3] Suspected.

[4] For the week ended Oct. 9, 1937, 2 cases of yellow fever were reported in Jos, Nigeria

[6] A dispatch dated June 4, 1937, from the United States legation in Asuncion, Paraguay, states that yellow fever has been officially reported in the northwestern part of Paraguay.

[7] Jungle type.

[8] For the week ended Oct. 9, 1937, 3 cases of yellow fever were reported in Gossas, Senegal

X

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THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg. Gen ROBERT OLESEN, *Chief of Division*

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PUBLIC HEALTH REPORTS

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GENERAL ASPECTS AND FUNCTIONS OF THE SICK BENEFIT ORGANIZATION[1]

By R. R. SAYERS, *Senior Surgeon*, GERTRUD KROEGER, *Senior Research Assistant*, and W. M. GAFAFER, *Senior Statistician, United States Public Health Service*[2]

The analysis and publication of morbidity data supplied from the records of industrial sick benefit organizations in the United States have constituted one of the activities of the Public Health Service for almost two decades. A grant from the Works Progress Administration in 1935 made possible for the first time in this country an occupational morbidity and mortality study (part of the National Health Survey) based on a large mass of industrial morbidity and mortality data. These data were transcribed from the medical records of about 550,000 members of sick benefit associations and other similar organizations covering the 5-year period 1930–34. Since it is known that data of this kind are in many instances influenced by the regulations governing these organizations, certain basic information concerning the conditions under which the organizations operate was obtained, generally at the time when the records were transcribed. It is the purpose of this paper to present this information together with other pertinent material relating to the organizations that made their records available.

DEVELOPMENT OF DIFFERENT TYPES OF SICK BENEFIT ORGANIZATIONS

For the purpose of the present study the sick benefit organizations which supplied data to the Occupational Morbidity and Mortality Study were classified thus: Mutual sick benefit associations; group insurance plans; and a third group, "all other organizations", which comprises medical care plans, companies granting to their employees sick leave with pay, and group payment plans. None of the organizations included in the third group was numerous enough to warrant separate treatment.

Mutual sick benefit associations.—Sick benefit associations developed in various ways. They are found, for instance, in connection with the early trade unions. Sidney and Beatrice Webb mention[3]

[1] From the Division of Industrial Hygiene of the National Institute of Health, U. S. Public Health Service, Washington, D. C.

[2] With the assistance of Dr. J. R. Miner.

[3] The History of Trade Unionism. Longmans, Green & Co., rev. ed., New York, 1926.

the "Friendly Society" and "Friendly Benefits", the latter sometimes being a part of the activities of a craft organization; the former denotes, though not always, a type of workers' organization established for the purpose of mutual aid. Names varied as did the membership. Some of the organizations admitted workers of one craft only while others had no such limitations.

The American Friendly Societies were patterned after the English models. Membership and names varied. At times when the right of workers to organize for the purpose of collective bargaining was under dispute, the Friendly Society constituted the least conspicuous form of organization which held the workers together. Today bona-fide trade unions also pay sickness, disability, and death benefits, although the number of unions which do so is small.[4]

With the growth of large industrial establishments employing hundreds and thousands of workers, plant benefit organizations came into being.

Sick benefit associations show certain characteristics reminiscent of an earlier day.[5] Most of them are founded on the principle of solidarity rather than upon business methods. They are not organized for profit and in most instances are not subject to the legal rules and regulations governing the commercial insurance business, as, for instance, the setting up of reserves. Sometimes dues and benefits are not calculated with regard to the risks involved. The assessment method is still being practiced by some organizations whenever the purse is empty or extraordinary needs arise. The extension of benefits, the continuation of membership after employment of a worker has been terminated, and the refusal of benefits for conditions resulting from behavior judged to be a misdemeanor (such as alcoholism, fighting, etc.) are often left to the discretion of the administrative body of the association.

Group insurance.—Commercial health insurance[6] on individual policies was first written in the United States in 1847. Accident

[4] No information from local unions is available concerning such activities Of 96 national and international unions that were approached 78 answered. the following number paid benefits. 63 paid death benefits, 14 disability benefits, 12 sickness benefits, and 20 had some form of insurance Nine unions carried group life insurance as a substitute for death benefits. The sick benefits ranged from $4 to $10 per week, $5 being the most common amount. Benefit periods ranged from 7 to 16 weeks, 13 weeks being the most common. Disability benefits usually were paid in a flat sum, ranging from $50 to $800 Only three organizations made weekly or monthly payments for disability Death benefits ranged from $20 to $1,500. $50 being the most common minimum, $200 to $300 the most common maximum (Beneficial Activities of American Trade Unions Bulletin No 465, U S. Bureau of Labor Statistics, Washington, 1928)

Provision of medical care was found to be one of the activities of six unions. One branch of the United Mine Workers of America (in Wyoming), and a branch of the International Union of Mine, Mill, and Smelter Workers provide such benefits. The following four unions also provide medical care: New York Letter Carriers, Empire Branch No 36, New York City; Employees' Mutual Benefit Association, Milwaukee; Womens' Local, Bureau of Engraving and Printing, Washington, D. C.; and Union Labor Benefit League, Los Angeles, Calif (Williams, Pierce: The Purchase of Medical Care Through Fixed Periodic Payment. National Bureau of Economic Research, Inc , New York, 1932, pp 291-301.)

[5] No attempt is made here to discuss the benefit activities of fraternal societies.

[6] Williams, Pierce: Cited in footnote 4, p. 253 ff.

coverage was added a few years later. The practice grew, and by 1910 casualty insurance companies covered practically all diseases. In 1896 life insurance companies entered the field and gradually expanded the coverage of risks.

Group health insurance as compared with individual insurance is relatively new. The first policy was written in 1911. Group insurance has been defined as "an attempt by insurers to insure a number of individuals forming a group under a simple blanket policy at reduced rates made possible by the elimination of medical examinations and other cost factors."[7]

While the activities of mutual sick benefit associations generally are not subject to State insurance laws, group insurance must conform to these laws. State insurance laws are not uniform They have been divided into three groups:[8]

1. Statutes which are capable of interpretation to permit temporary or total disability, accidental death, or dismemberment insurance in group form (Washington and North Carolina).
2. Statutes which attempt neither to define group insurance nor to enumerate permissible groups, but merely except such policies from general rules which otherwise might invalidate them (Arizona, Connecticut, Florida, Idaho, Maine, Minnesota, West Virginia, New Hampshire, Mississippi, Nebraska, Oklahoma, Kansas, and Delaware). This lack of affirmative regulation accords insurance companies freedom to apply the group insurance plan to new situations.
3. Statutes regulating minor phases of group insurance, thereby acknowledging its legality (Tennessee, Georgia, Illinois, Kentucky, Louisiana, New Mexico, South Carolina, Missouri, Alabama, Maryland, Montana, Nevada, North Dakota, Rhode Island, South Dakota, Utah, Vermont, and Wyoming. In approximately 10 of these States there is no mention of group insurance.).

Group insurance does not usually require the applicant to pass a physical examination. Thus health and life insurance are made available to those employees who, because of physical defects, could not obtain individual policies. Group insurance may either be compulsory for all employees of the plant, or it may be voluntary. In the latter case, the insurance company as a rule requires that at least 75 percent of the employees join, in order to have a fair distribution of risks. Groups presenting unfavorable risks are either excluded or premiums are calculated accordingly.

Group payment plans.[9]—Group payment plans represent an attempt to provide members of the "plan" with medical care in time of need by enabling them to include the expense of medical care in their monthly budgets.

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[7] Standard definition of the National Convention of Insurance Commissioners, 1918, quoted *in* Some Economic and Legal Aspects of Group Insurance Policies, Columbia Law Review, vol. 36 (January), 1936, p. 89 ff

[8] Ibid . p. 94 ff.

[9] "Group payment plans" are classified in this paper under "All other organizations."

As a rule, both mutual sick benefit associations and group insurance offer cash benefits as a substitute for wage income when sickness suspends the earning power of the insured. Some of these organizations provide benefits in kind, such as services of a physician or a hospital or both.

Group payment plans are of recent origin.[10] Plans differ widely in details, but all of them are unified in the objective of making the unpredictable cost of medical care a budgetable item by spreading the risk of sickness among a group of people. This purpose is accomplished by having a group of subscribers make equal and regular payments into a common fund which is used to pay medical bills for those requiring medical care.

The scope of medical care provided varies. A considerable number of plans offer only hospital services.[11] Plans may be State-wide in their inclusion of hospitals, as in the case of North Carolina and Alabama; city-wide; or they may include only several hospitals in one city or area, or be limited to one hospital exclusively.

Hospital service plans do not affect the patient's free choice of physician and the financial arrangements between patient and physician.

Other plans, often initiated and controlled by a medical society, offer physicians' services; still others provide both physicians' and hospitals' services. Sometimes plans providing complete medical care are organized in the form of a group clinic.

The remaining sections of the paper will examine the data obtained from the sick benefit organizations.

GENERAL ASPECTS

Collection of data.—The sick benefit organizations discussed in this paper supplied data to the Occupational Morbidity and Mortality Study. Wherever possible the information pertaining to the rules and regulations of the sick benefit organizations was obtained from the constitution and bylaws of each organization; in the absence of printed information an effort was made to secure the data from an official of the organization. In some cases information was not available.

TYPES OF SICK BENEFIT ORGANIZATIONS

The sick benefit organizations may be classified as follows:

1. *Mutual sick benefit associations.*—Included in this group are all organizations which operate on the basis of mutual aid and which pay a cash benefit upon the sickness of a member without recourse to

[10] The first hospital service plan was established in Dallas, Tex., in 1930. (Rorem, C. Rufus: Group Budgeting for Hospital Care, American Hospital Association, 2 ed., Chicago, 1936, p. 4.)

[11] These plans had about 720,000 members on Jan. 1, 1937. Of this number, more than 600,000 were enrolled with 35 nonprofit associations, the 18 largest reporting 374,000 employed subscribers and 212,000 dependents. (Hospitals, vol. 11 (February 1937), p. 69.)

commercial insurance. Administrative control divides this group into three classes:

(a) Employee-managed associations: These are governed by the employees themselves, either by an individual or by a board composed of employees. As a rule, the administrative officer or board is elected by the members. In a few instances one or more members of the board are appointed by the employer. Whenever such appointees are workers, the association has been classified as "employee managed."

(b) Employer-managed associations: This term was applied to associations which are controlled by the company, either by an individual or by a board appointed by the company.

(c) The third class was called "jointly managed" because administrative control is exercised by the members of the association and by the employer.

2. *Group insurance.*—This group includes all commercial insurance plans.

3. *All others.*—These comprise different types. Several of the companies included in this study have no sick benefit organization, but provide sick leave with pay and keep records of the illness of employees through a relief department or a company dispensary. The medical care plans are also listed in this group.

A total of 731 industrial plants is included in this study; 54 did not report their type of sick benefit organization. Three hundred and six, or 45 percent, of those reporting type operate mutual sick benefit associations. Of these, 158 are employee managed, 28 are employer managed, and 120 are jointly managed. Three hundred and twenty, or 47 percent, of the plants reporting type subscribe to group insurance plans; and 51 plants operate organizations classified as "all others." Table 1 summarizes these data.

TABLE 1.—*Number and percent of plants with indicated type of sick benefit organization*

Type of organization	Plants	
	Number	Percent
Total with known type [1]	677	100.0
Mutual sick benefit associations	306	45.2
Employee managed	158	23.4
Employer managed	28	4.1
Jointly managed	120	17.7
Group insurance plans	320	47.3
"All others"	51	7.5

[1] 731 plants are included in the study; 54 failed to report on type.

DISTRIBUTION OF SICK BENEFIT ORGANIZATIONS IN RELATION TO PLANT UNITS [12]

The distribution of sick benefit organizations in relation to plant units is shown in table 2. A total of 381 organizations covers 731 plants.

[12] A "plant" as used in this study is not necessarily a factory in which goods are manufactured. For present purposes the term was also applied to the territorial offices and shops of the various railroads.

In 337 cases a benefit organization applies only to 1 plant, while 44 organizations cover 394 plants. In 26 instances 1 organization includes 2 plants; in 5 cases, 3 plants. The largest number of plants covered by 1 organization was 73, the next largest, 60. Both of these organizations are group-insurance plans.

TABLE 2.—*Distribution of types of sick benefit organizations according to the number of plants covered by each*

Number of plants covered by 1 sick benefit organization	Number of sick benefit organizations covering specified number of plants					Total number of plants covered
	All types	Mutual sick benefit associations	Group-insurance plans	All other types	Type unknown	
Total	381	155	147	41	38	731
1	337	133	131	40	33	337
2	26	12	11		3	52
3	5	3	1		1	15
4	1	1				4
6	1	1				6
11	1			1		11
12	2	1			1	24
15	2	1	1			30
16	1		1			16
20	1	1				20
36	1	1				36
47	1	1				47
60	1		1			60
73	1		1			73

DISTRIBUTION OF PLANTS WITH SICK BENEFIT ORGANIZATIONS BY STATES AND GEOGRAPHIC REGIONS

The plants included in this survey are located in 41 States, the District of Columbia, the Hawaiian Islands, and Canada.[13] As is indicated, among other things, in table 3, 50 percent of the plants are located in the New England, Middle Atlantic, and East North Central States. The Mountain and Pacific States account for 20 percent of the plants.

The distribution of types of organizations by geographic region shows a preponderance of mutual sick benefit associations in the New England States. Forty, or 74 percent, of all plants in this region were included in this type of organization. Of these, 34, or 85 percent, are in Massachusetts. The South Atlantic States show the next largest percentage of mutual benefit associations, namely, 40, or 61 percent. Of these, 23, or over one-half, are located in Maryland.

[13] The geographical distribution of plants is influenced by the fact that only 17 States originally were included in the Occupational Morbidity and Mortality Study. These States are California, Illinois, Louisiana, Maryland, Massachusetts, Michigan, Minnesota, Missouri, New Jersey, New York, Ohio, Oregon, Pennsylvania, Texas, Utah, Virginia, and Washington Additional plants in other jurisdictions than these 17 are included mainly because some of the industries studied in the original 17 States maintain branch offices, factories, or shops outside of these States. The additional jurisdictions comprise 24 States, the District of Columbia, the Hawaiian Islands, and Canada. The 24 States are Alabama, Arizona, Arkansas, Colorado, Connecticut, Delaware, Florida, Georgia, Indiana, Iowa, Kansas, Kentucky, Maine, Nebraska, Nevada, New Hampshire, New Mexico, North Carolina, Oklahoma, South Carolina, South Dakota, Tennessee, West Virginia, and Wisconsin.

Table 3.—*Geographic distribution of plants with different types of sick benefit organizations, and distribution in each geographic region of plants according to type of sick benefit organization*

Geographic region [1]	All plants		Plants with— Mutual sick benefit associations			Group-insurance plans			All other types			Type unknown		
	Number	Percent	Number	Percent	Percent of all plants in the indicated region	Number	Percent	Percent of all plants in the indicated region	Number	Percent	Percent of all plants in the indicated region	Number	Percent	Percent of all plants in the indicated region
All regions	731	100.0	306	100.0	41.8	320	100.0	43.8	51	100.0	7.0	54	100.0	7.4
New England	54	7.4	40	13.1	74.1	8	2.5	14.8	2	3.9	3.7	4	7.4	7.4
Middle Atlantic	182	24.9	73	23.9	40.1	87	27.2	47.8	11	21.6	6.0	11	20.4	6.1
East North Central	135	18.5	59	19.3	43.7	58	18.1	42.9	9	17.6	6.7	9	16.7	6.7
West North Central	93	12.7	32	10.4	34.4	50	15.6	53.8	1	2.0	1.1	10	18.5	10.7
South Atlantic	66	9.0	40	13.1	60.6	23	7.2	34.9	3	5.9	4.5	----	----	----
East South Central	12	1.6	5	1.6	41.7	7	2.2	58.3	----	----	----	----	----	----
West South Central	40	5.5	11	3.6	27.5	25	7.8	62.5	2	3.9	5.0	2	3.7	5.0
Mountain	19	2.6	8	2.6	42.1	11	3.5	57.9	----	----	----	----	----	----
Pacific	127	17.4	37	12.1	29.1	49	15.3	38.6	23	45.1	18.1	18	33.3	14.2
Hawaiian Islands	1	.1	1	.3	100.0	----	----	----	----	----	----	----	----	----
Canada	2	.3	----	----	----	2	.6	100.0	----	----	----	----	----	----

[1] New England Connecticut, Maine, Massachusetts, and New Hampshire Middle Atlantic New Jersey, New York, and Pennsylvania East North Central: Illinois, Indiana, Michigan, Ohio, and Wisconsin West North Central: Iowa, Kansas, Minnesota, Missouri, Nebraska, and South Dakota. South Atlantic Delaware, District of Columbia, Florida, Georgia, Maryland, North Carolina, South Carolina, Virginia, and West Virginia. East South Central Alabama, Kentucky, and Tennessee West South Central Arkansas, Louisiana, Oklahoma, and Texas Mountain Arizona, Colorado, Nevada, New Mexico, and Utah. Pacific: California, Oregon, and Washington.

A predominance of group-insurance schemes as compared with mutual benefit associations is found in the West South Central States, namely, 25, or 63 percent. Ten of these are in Oklahoma, and seven in Texas. In the West North Central, East South Central, and Mountain States the percentages of group-insurance plans as compared with mutual sick benefit associations exceeded 50, the figures being 54, 58, and 58, respectively.

The picture changes, however, if the geographical distribution of each type of organization is considered separately. Almost one-fourth, namely, 73, or 24 percent, of all plants with mutual sick benefit associations are found in the Middle Atlantic States; 59, or 19 percent, in the East North Central States; 40, or 13 percent, in the South Atlantic States; and 37, or 12 percent, in the Pacific States.

Eighty-seven, or 27 percent, of the plants with group-insurance plans operate in the Middle Atlantic States; 58, or 18 percent, in the East North Central; 50, or 16 percent, in the West North Central; and 49, or 15 percent, in the Pacific States.

Of the group "all others", 23, or 45 percent, are located in the Pacific States. Of these, 14 are in California. Twelve of the 23 plants covered by the organizations included in this group have "medical care plans." Of these, seven are in California and five in Washington.

DISTRIBUTION OF PLANTS WITH SICK BENEFIT ORGANIZATIONS BY INDUSTRIES AND INDUSTRIAL GROUPS

An aggregate of 79 industries which belong to 20 industrial groups are represented in this study. Five industrial groups—transportation and communication, chemical and allied industries, iron and steel machinery and vehicles, food and allied industries, and electric industries—include 529, or 72 percent, of the plants.

Over one-third, or 36 percent, of the plants are found in the transportation and communication group. Steam railroads constitute the largest number of plants in this group, namely, 62 percent of the group and 22 percent of all plants. The next largest number of plants is found in the chemical and allied industries, namely, 13 percent. This group comprises 6 industries. Thirty-nine percent of the plants belong to the soap factories, 13 percent to paint and varnish factories. The iron and steel machinery and vehicle industries contain 10 percent of all plants; 22 percent of this group are found in iron and steel machinery and 14 percent in blast furnaces and steel rolling mills.

The food and allied industries contain 8 percent of the plants, with slaughter and packing houses (39 percent of this group) predominating. The electric industries present 6 percent of the plants. These are about evenly divided between electric light and power plants and public utilities (51 percent) and electric machinery and supply factories (49 percent).

The remaining plants are distributed among agriculture, fishing, and forestry; extraction of minerals; clay, glass, and stone; clothing; metal (lead and zinc plants comprise 48 percent of the plants); leather (shoe factories represent 64 percent of the plants); lumber and furniture (saw and planing mills represent 82 percent of the plants); paper, printing, and allied industries (pulp and paper mills comprise 46 percent, and printing, publishing, and engraving 31 percent of the plants); textile industries; wholesale and retail trade; banking and brokerage; public service; professional service; domestic and personal service, and miscellaneous industries.

The industrial distribution of types of sick benefit organizations shows that 388, or 57 percent, of all plants for which the type of sick benefit organization is known are concentrated in 9 industries—postal service; steam railroads; soap factories; slaughter and packing houses; chemical factories; bus, cab, transfer, and truck business; iron and steel factories; electric machinery and supply factories; and public service. Thirty-five percent of the "employee managed" organizations are found in the postal service, and 54 percent of the "employer managed" in steam railroads. Thirty percent of the plants with "jointly managed" mutual benefit associations are found in the soap industry, 17 percent in slaughter and packing houses, and 13 percent in steam railroads. Thus 141, or 46 percent, of all plants

with mutual sick benefit associations are found in the four industries mentioned. A total of 194, or 61 percent, of the group insurance plans operate in 5 industries: 41 percent in steam railroads; 6 percent in chemicals; 5 percent in bus, cab, transfer, and truck; 5 percent in iron and steel; and 4 percent in electric machinery and supply factories.

Forty-one percent of "all other" organizations are found in two industries—21 percent in chemicals and 20 percent in public service.

DISTRIBUTION OF MEMBERS OF SICK BENEFIT ORGANIZATIONS

The number of members refers to the year 1934. Males and females are not separated. Forty-two plants, 5.7 percent, did not report the number of members. The number of members of sick benefit organizations must not be confused with the number of persons whose sickness records were studied. While the number of members refers to the year 1934, the study of the sickness records extended over a 5-year period, from 1930 through 1934. During this period greater or lesser labor turnover took place in all industries. In some instances only a sample of the members of a sick benefit organization was studied. This fact accounts for the differences between membership and persons studied in those groups where the latter show a smaller number than the former. The total number of "known" members is 621,370; the total number of persons studied is approximately 550,000. The ratios of these two groups varies from industry to industry.

The industrial distribution of members follows the distribution of plants to some extent. A total of 467,600, or 75 percent, of the members are located in 6 industrial groups. Thirty-two percent of the total members are found in transportation and communication; of this group, 65 percent are employees of steam railroads. Twelve percent of all members work in the iron and steel machinery and vehicle industries; 37 percent of this group are found in blast furnaces and steel rolling mills, 21 percent in iron and steel machinery. Eleven percent are employed in the food and allied industries; of these, 72 percent belong to slaughter and packing houses. Eight percent are found in the electrical industries; of these, 53 percent work in electric light and power plants and public utilities, 47 percent in electric machinery and supply factories. Six percent of all members are employed in leather manufacturing; of these 90 percent work in shoe factories. The chemical and allied industries employ 6 percent of all members; of these, 20 percent work in soap factories, 18 percent in paint and varnish factories, and 18 percent in petroleum refineries. The remaining 25 percent of all members are distributed among 14 industrial groups.

The distribution of members among the different known types of organizations (table 4) shows that 66 percent belong to mutual sick benefit associations (18 percent to employee-managed organizations,

19 percent to employer-managed organizations, and 29 percent to jointly managed organizations); 25 percent of the members are covered by group insurance plans; and 9 percent belong to organizations classified as "all others."

TABLE 4.—*Distribution of members of sick benefit organizations according to type of organization*

Type of organization	Members	
	Number	Percent
Total with known type [1]	586,260	100.0
Mutual sick benefit associations	387,070	66.0
Employee managed	107,420	18.3
Employer managed	111,050	18.9
Jointly managed	168,600	28.8
Group insurance plans	149,320	25.5
"All others"	49,870	8.5

[1] Of the grand total of 621,370 known members of sick benefit organizations, 35,110 belonged to organizations that failed to report on type.

DATE OF ESTABLISHMENT OF SICK BENEFIT ORGANIZATIONS

As is to be expected, there is a distinct difference in the date of establishment among the types of sick benefit organizations. This date is known for 391 of the plants. One hundred and thirty-four, or 95 percent, of the group insurance plans for which the date of establishment is known came into existence in or after 1925, while 183, or 84 percent, of the mutual sick benefit associations with known date of origin were organized prior to 1925. Of all organizations established prior to 1890 and up to 1925, 86 percent are mutual sick benefit associations, while only 19 percent of all organizations founded in the period 1925–34 belong to this group. Seventy-six percent of sick benefit plans which came into being in the period 1925–34 are group insurance plans.

If all organizations with known date of origin are considered, mutual sick benefit organizations established prior to 1890 and up to 1925 constitute 47 percent of all plans, while the group insurance plans established between 1925 and 1935 constitute 34 percent of all plans.

If only the last 5 years under consideration (1930–34) are regarded, the predominance of group insurance plans among plants included in this study is apparent. Sixty-five percent of the organizations which arranged for sick benefits during this period subscribe to group insurance. Twenty-eight percent were organized on the basis of mutual aid, and only 1 percent belongs to the group "all others."

In the following groups of States the growth of sick benefit organizations in the 10 years 1925–34 was about equal to that of the entire

period from before 1890 to 1925, not considering organizations which were established and terminated during this period:

Middle Atlantic States: Before 1925, 50 percent; 1925–34, 50 percent.
East North Central States: Before 1925, 52 percent; 1925–34, 48 percent.
Pacific States: Before 1925, 51 percent; 1925–34, 49 percent.

In the following groups of States a greater number of sick benefit organizations was established in the period prior to 1925 than since:

New England States: Before 1925, 74 percent; 1925–34, 26 percent.
West North Central States: Before 1925, 69 percent; 1925–34, 31 percent.
South Atlantic States: Before 1925, 66 percent; 1925–34, 34 percent
Mountain States: Before 1925, 67 percent; 1925–34, 33 percent.

Only two groups of States showed a greater growth in the later period:

East South Central States: Before 1925, 25 percent; 1925–34, 75 percent.
West South Central States: Before 1925, 32 percent; 1925–34, 68 percent.

However, in some of these States or groups of States the number of plants for which the date of establishment of a benefit organization is known is too small for the percentages to be significant.

In three groups of States—Middle Atlantic, East North Central, and Pacific—20 percent or more of the organizations included in this study were established since 1929. In two groups of States, East South Central and Mountain, no organizations were established since 1929.

Of the plants which established benefit organizations in the decade 1925–34, 39 percent belong to the industrial group transportation and communication, 13 percent to the chemical and allied industries, 12 percent to iron and steel machinery and vehicle industries. Thus two-thirds of the plants with benefit organizations established during this decade belong to three industrial groups. Four groups, transportation and communication (16 percent), chemical and allied industries (21 percent), iron and steel machinery and vehicle industries (11 percent), and food and allied industries (14 percent) contain two-thirds of the plants which founded sick benefit organizations prior to 1925.

The following industrial groups established 50 percent or more of their organizations since 1924: Transportation and communication (66 percent); public service (63 percent); clay, glass, and stone factories (60 percent); lumber and furniture industries (50 percent); extraction of minerals (67 percent); domestic and personal service (50 percent). Of these, two groups—public service and extraction of minerals—established about two-thirds of their organizations since 1929.

RULES GOVERNING MEMBERSHIP

General requirements.—Of the 691 plants which reported their membership requirements, 6 reported "no special requirements."

Since, as a rule, only employees may become members of a sick benefit organization, these six plants were included in the group of plants which have only one membership requirement, namely, that the applicant must be an employee. Thus 584, or 84 percent, of the 691 plants require only "employee status" of the applicant for membership. Twenty-six of these plants specify that the employment must be permanent or full time. Sixty-seven, or 10 percent, of the plants which reported requirements specify "good health" in one form or another. The remaining 6 percent have various requirements, such as "white males", "wage earners with dependents", etc.

In 518, or 71 percent, of the plants, membership is voluntary. In this group both mutual benefit associations and group insurance plans are represented, each with 45 percent of the plants. In the compulsory group, comprising 207 plants, 34 percent are covered by mutual benefit associations and 41 percent by group insurance.

Age limits.—Four hundred and fifty, or 62 percent, of the plants have no age limits for membership. Of these, 128, or 28 percent, belong to mutual sick benefit associations, and 267, or 59 percent, to group insurance plans. Of all plants with mutual sick benefit associations the 128 which have no age limits constitute 42 percent, while of the plants covered by group insurance 83 percent have no age limits. Of the remaining 234 plants which specify age limits, 167 have only upper age limits, 12 only lower limits, and 55 have both lower and upper age limits. The lower limits vary from 14 to 21 years, the upper from 35 to 70 years.

Exclusion of persons with chronic diseases.—Two hundred and ten, or 29 percent, of all plants debar from membership persons afflicted with chronic diseases. A total of 172, or 56 percent, of the mutual benefit associations have such a ruling, while 288, or 90 percent, of the plants having group insurance do not debar such persons from membership. Of the 172 mutual benefit associations which exclude persons with chronic diseases, 104, or 60 percent, admit such persons to membership with the understanding that no benefits will be paid for these diseases.

The following defects, mentioned in some of the constitutions and bylaws of mutual sick benefit associations, debar from membership: Hernia, venereal diseases, trench mouth, gastric ulcer, decayed teeth, alcoholism, pregnancy, diseases of the heart and vascular system, tuberculosis, any "constitutional disease", and any condition likely to cause disability or sickness. In some cases a person's exclusion from membership is left to the discretion of the company or association.

Occupations excluded.—Six hundred and four, or 83 percent, of all plants admit to membership persons in all occupations. Two hundred and six, or 34 percent, of these operate mutual benefit associations; 50 percent have group insurance plans.

Service requirements.—A total of 185, or 25 percent, of all plants admit a person to membership immediately upon application; 535, or 73 percent, require varying periods of employment before a worker becomes eligible for membership. Seventy-five, or 10 percent, of the plants require less than 30 days' employment; 94, or 13 percent, require 30 days; 91, or 12 percent, require 61 to 120 days; 210, or 29 percent, require 121 to 180 days; and 29 plants require a full year's employment.

Of the plants with mutual benefit associations, 111, or 36 percent, admit workers to membership immediately upon employment. Another 132, or 43 percent, require from 1 to 30 days of employment. Thus these two groups account for 79 percent of all plants with mutual benefit associations.

Only 11, or 3 percent, of the plants operating under group insurance plans admit a person to membership immediately upon employment. Sixty-six, or 21 percent, of the plants require from 61 to 120 days, while 197, or 62 percent, require from 121 to 180 days. These two groups together constitute 83 percent of all plants with group insurance.

Retention of membership.—(*a*) During lay-offs. In 451, or 62 percent, of the plants members of sick benefit organizations may retain their membership and be entitled to sick benefits during lay-offs. In 154, or 21 percent of the plants, membership may be retained for 15 days to 1 month; in 201, or 28 percent, for 32 days to 6 months; 52, or 7 percent, of the plants allow continuation of membership indefinitely; and 212, or 29 percent, of the plants terminate membership upon the occurrence of a lay-off. (*b*) After separation. Five hundred and nineteen, or 71 percent, of all plants require termination of membership upon discharge of the worker. A total of 138 permit continuation of membership for varying periods of time—42 for 15 days to 1 month, 48 for 32 days to 6 months, 38 for an indefinite period of time, and 10 for other stated periods.

Physical examination upon employment. Rejection from employment because of physical defects. Exclusion from membership in sick benefit organizations.—Special efforts were made to obtain information concerning physical examinations given by the employer before or upon hiring an applicant for work. Four hundred and ninety-four, or 68 percent, of the plants give such an examination, 11 percent do not, and 21 percent did not report.

Plants which rejected applicants for employment in 1934 because of their physical conditions numbered 175, or 24 percent, of all plants. Two hundred and thirty-five, or 32 percent, reported no rejections; 44 percent made no report; and 31 plants reported a very small percentage, or practically none, rejected. Seventeen reported 1 percent rejections, 38 reported 1.1 to 5.0 percent, and 72 reported 5.1 to 10.0 percent. Three plants reported over 25 percent rejections. Of the

plants operating mutual benefit associations, 34 percent reported rejections of applicants. Of the plants with group insurance, only 15 percent reported rejections.

A total of 365, or 50 percent, of the plants excluded no applicants for membership in 1934. Thirty-two percent made no report. One hundred and twenty-nine, or 18 percent, excluded applicants. Of the plants having mutual benefit associations, 100, or 33 percent, excluded applicants; of those operating under group insurance plans, only 9 excluded applicants in 1934.

PAYMENT OF SICK BENEFITS

The rules and regulations governing sick benefits have a distinct bearing upon the morbidity rates which are based upon records of sick benefit organizations. As a rule, the data recorded by these organizations do not deal with all illnesses which occur among the members nor with the entire periods of their occurrence.

Benefits are paid only for disabling illnesses; hence a disease which does not prevent an employee from performing his duties is not compensable and, as a rule, is not recorded. During the waiting periods no illnesses are recorded. Waiting periods vary with the different organizations. The periods for which sick benefits are paid also vary. Hence, morbidity rates are comparable only for organizations having the same waiting period after the onset of disability and the same length of benefit period. However, the length of the benefit period does not affect the recorded incidence rate; it influences the time lost and severity rates for those illnesses which extend beyond the termination of benefit payments.

Generally, two types of waiting period are in effect: (*a*) An initial waiting period, that is, the time between admission to membership and eligibility for benefits; and, (*b*) the waiting period between onset of disability and commencement of payment of benefits.

Initial waiting period.—Of the total of 731 plants, 455, or 62 percent, have no initial waiting period. These plants had a total of 367,260 members, 59 percent of the total "known" members. One hundred and fifty, or 21 percent, of all plants, covering 20 percent of all members, have a waiting period of 15 days to 1 month.

Of the plants with mutual benefit associations, 145, or 47 percent, have no initial waiting period; 108, or 35 percent, have a waiting period of 15 days to 1 month; 34, or 11 percent, have one of over 1 month to 3 months. Of the plants operating under group insurance, 292, or 91 percent, have no waiting period.

Waiting period after onset of disability.—Only 7 of the plants, having 5,440 members, have no waiting period after the onset of disability. Four hundred and forty-one, or 60 percent, have a 7-day waiting

period; 82, or 11 percent, have a 7-day waiting period with payments of benefits retroactive to a specified date.

Of the plants with mutual benefit associations, 137, or 45 percent, have a 7-day waiting period; 75, or 25 percent, have a 7-day retroactive waiting period. Two hundred and seventy-seven, or 87 percent, of the plants with group insurance have a 7-day waiting period.

Classes of membership.—A total of 102, or 14 percent, of the plants have no formal classes of membership. In this group are included the 15 plants which pay a percentage of wages during illness. Also included in this group are 60 plants which pay a definite amount of benefits for each specified wage unit within a set lower and upper limit. Other plants in this group make length of employment exclusively, or in addition to amount of wages, the basis of the amounts of their benefits.

A total of 274, or 37 percent, of the plants have definite classes of membership ranging in number from 2 to 9 or more, based usually upon any or all of the following conditions: Earnings, length of service, type of position, and sex.

Dues or premiums paid by members.—Minimum dues range from $0.10 to $4 per month, maximum dues from $0.10 to $15 per month. Not quite one-third of the plants with mutual benefit associations (93, or 30 percent) impose upon their members maximum dues ranging from $0.50 to $0.69 per month; the minimum amounts for this group range from $0.10 to $0.69. Fifty-seven, or 19 percent, of the plants ask for dues of $1 to $1.49 per month as a maximum; the minimum amounts for this group extend from $0.10 to $1.49. Together these two groups of plants account for about one-half of all plants with mutual sick benefit associations.

Of the plants having group insurance plans, 212, or 66 percent, pay maximum monthly dues of $1 or more. The minimum dues begin with $0.10 and extend to $4 per month; the maximum in this group extends to $10.70.

Benefit period per case and maximum period per year.—The benefit period per case ranges from 3 weeks to 104 weeks. A total of 81 plants state that their benefit period per case is "continuous," without specifying whether or not this term applies to the calendar year, namely, 52 weeks.

Thirty-six, or 5 percent, of the plants have different benefit periods for different classes of membership. A total of 190, or 26 percent, of the plants pay benefits for 13 weeks with a limit of 6 weeks for cases of pregnancy; 187, or 98 percent, of this group of plants operate under group insurance plans. These 187 plants constitute 58 percent of all plants with group insurance plans. Another 21 percent of the plants with group insurance have also a 13-week benefit period with no special arrangement for cases of pregnancy. One hundred and twenty-

three, or 17 percent, of all plants have a benefit period of 13 weeks' duration; 55 percent of these have group insurance plans. A total of 116, or 16 percent, have a benefit period of 26 weeks' duration; 73, or 63 percent, of this group operate mutual benefit associations.

The maximum benefit period per year ranges from 3 to 52 weeks. Four hundred and thirty-one, or 59 percent, of all plants pay benefits for a maximum period of 52 weeks; 278, or 65 percent, of the plants in this group operate under group insurance. One hundred and nine, or 36 percent, of the plants with mutual benefit associations and 278, or 87 percent, of the plants having group insurance have a maximum benefit period per year of 52 weeks.

Resumption of payment of sick benefits for new cases of illness and for chronic cases.—The rules regarding the resumption of payments of sick benefits within a calendar period are closely related to the rules concerning benefit periods in general. A sick benefit organization which permits resumption of benefit payments extends in fact the benefit period, especially since in a number of cases only a very brief intervening period of work is required. Most organizations distinguish between new cases and chronic cases of illness in their resumption of payments.

Of the 504 plants which made reports on the subject, 240, or 48 percent, practice no resumption of payments for chronic cases; 213, or 42 percent, do so with or without requiring the member to satisfy certain conditions.

A total of 190 of the 306 plants with mutual benefit associations answered the question concerning resumption of payment for chronic cases. Sixty-six, or 35 percent, of this group do not resume payment of benefits for chronic cases; 124, or 65 percent, do so. Of the 320 plants covered by group insurance, 226 replied to this inquiry. Of these, 155, or 69 percent, do not resume benefit payments for chronic cases; 71, or 31 percent, do resume payments.

A total of 364, or 65 percent, of the plants which reported on the resumption of benefit payments for new cases of illness answered this question in the affirmative and 143, or 26 percent, in the negative. Of the 222 reporting plants with mutual sick benefit associations, 166, or 75 percent, resume benefit payments on new cases of illness; 56, or 25 percent, do not. Of 236 reporting plants covered by group insurance, 168, or 71 percent, resume payment; 68, or 29 percent, do not.

Extension of benefit period.—The extension of the period for which benefits are paid beyond the maximum fixed by rules and regulations is often left to the discretion of the administrative organ of the benefit organization. Only 111, or 15 percent, of all plants make provision for an extension of the benefit period.

Sick benefits.[14]—The minimum benefit ranges from $0.50 to $40.49 per week; the maximum benefit ranges from $0.50 to $90.49 per week. A total of 414, or 57 percent, of all plants pay a maximum benefit per week of $14.50 or more. One hundred and sixty-four, or 54 percent, of the plants with mutual sick benefit associations pay maximum benefits ranging from $4.50 to $14.49 per week; 43 percent pay maximum benefits ranging from $14.50 to $40.49 per week. Of the plants covered by group insurance 133, or 42 percent, pay a maximum benefit ranging from $9.50 to $19.49; 54 percent pay a maximum ranging from $19.50 to $40.49. Only 2 percent of the plants with group insurance pay a maximum benefit of $4.50 to $9.49, while 21 percent of the plants with mutual benefit associations pay these amounts.

Payment of sick benefits for fraction of week.—The size of sick benefits is also slightly influenced by rules which determine whether benefits are to be paid for full weeks only or for fractions of a week. A total of 638, or 87 percent, of the plants pay benefits for a fraction of a week, 17 plants do so only after the first full week, 3 plants pay for fractions of a week under certain conditions, and 15 plants pay for full weeks only.

Payment of wages during disability.—A total of 234, or 32 percent, of the plants do not continue the payment of wages during disablement of an employee. Three hundred and seventy-one, or 51 percent, of the plants pay wages under certain conditions. Two hundred and twenty of these plants do so in special cases, in 63 of these plants salaried employees are kept on the pay roll, and in another 63 of these plants both salaried employees and foremen continue on the pay roll during illness. Some of the plants listed as "all others" pay wages instead of sick benefits during the illness of an employee.

Reporting of disabling illnesses.—In order to draw benefits a disabled member must report his condition to the sick benefit organization. A total of 151, or 21 percent, of the plants require that their members make such reports within 24 hours of the onset of a disability, 52 plants allow 48 hours in which to make such reports, and 42 allow 3 days. One hundred and four plants grant a time limit of 1 week; 159 allow an incapacitating illness to remain unreported up to 2 weeks. Fifty-five plants exceed the time limit of 2 weeks, one plant allowing reports to come in later than 3 months after the onset of a disease.

Practically all plants require that a disabled member be examined by a physician and that the latter's certificate be submitted to them. A somewhat smaller percentage of plants demand that the physician also report his diagnosis.

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[14] The term "sick benefit" as used in this paper denotes cash benefit. Organizations which pay no cash benefits but provide medical care or sick leave with pay are classified as "all other organizations", the benefits of which were not studied in detail. Furthermore, this paper does not deal with any phase of medical care provided by the employers, the sick benefit organizations, or the insurance companies.

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Refusal of benefits.—A number of plants refuse the payment of sick benefits for disabilities created by the following causes: Improper use of stimulants or narcotics, immoral practices, voluntary self-injury, fighting, unlawful acts, venereal diseases, maternity, and a number of other causes. One hundred and twenty-one plants refuse benefits for all of the following causes: Improper use of stimulants or narcotics, immoral practices, self-injury, fighting, venereal diseases, unlawful acts. Forty-five plants list maternity in addition to the foregoing causes. Self-injury is the only cause excluded by 92 plants, fighting the only cause excluded by 74 plants.

Supervision of disabled members.—A total of 710 of the plants reported their methods in the control of "malingering," some using more than one method. Two hundred and ninety-one of the plants appoint a visiting committee to call upon the disabled member and report on his condition. In 203 plants this duty is delegated to the association physician, and in 132 plants to the association nurse. In 72 plants the company physician is responsible for the supervision of the disabled members.

SUMMARY

An occupational morbidity and mortality study (part of the National Health Survey) was begun in 1935, following a grant from the Works Progress Administration. Material obtained in connection with this study is presented on 381 sick benefit organizations covering 731 industrial plants. A brief historical introduction relating to the development of different types of sick benefit organizations is presented, and reference is made, among other things, to the dates of establishment of the organizations, together with their geographic and industrial distribution, membership and service requirements, waiting periods, classes of membership, dues, benefit periods, sick benefits, reporting of disabling illnesses, and refusal of benefits.

TREATMENT OF PSORIASIS WITH MASSIVE DOSES OF CRYSTALLINE VITAMIN D AND IRRADIATED ERGOSTEROL

A Preliminary Report [1]

By E. T. CEDER, *Passed Assistant Surgeon,* and LEO ZON, *Assistant Surgeon (R), United States Public Health Service* [2]

Psoriasis has been recognized for many years as one of the most frequent disorders of the skin. Lane and Crawford found it to constitute about 6 percent of all skin diseases seen in a dermatological

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[2] We wish to express our appreciation to Dr. Harry Robinson, of the University of Maryland, and Dr. W. H. Sebrell, of the U. S. Public Health Service, for their cooperation in this study.

clinic (*1*). Numerous concepts regarding its infectious, metabolic, or neurogenic nature have been offered; and, consequently, a tremendous variety of therapeutic agents have been employed. Only a few have been found to afford any benefit to the majority of the patients afflicted with this chronic and obstinate dermatopathy.

One fact that is popularly known, however, is that sufficient ultraviolet irradiation promotes involution of the psoriatic process in many instances. This is substantiated by the fact that the condition is less prevalent in the tropics, worse in winter than in summer, and that therapeutic irradiation has been successfully used by dermatologists in their practice (*2*, *3*).

Goeckermann (*4*) has outlined a treatment consisting of ultraviolet irradiation of crude coal tar applied to the lesions, and he and numerous other workers have found this to be a consistent remedy in controlling attacks. He found that the irradiation of crude coal tar was more effective than the use of either agent alone.

Herrick and Sheard (*5*), in attempting to learn what pharmacological mechanism was involved, performed photo-chemical studies on the ultraviolet irradiation of crude coal tar. It was suggested by these workers that a new chemical was formed which exerted a beneficial effect. By spectroscopic examination, it was recognized that a new substance had been produced which could not be definitely identified. In the past decade, viosterol, a common irradiated ergosterol product, has been employed in small doses without signal success. Krafka (*6*), however, recently reported benefit following larger doses of viosterol in 3 cases of psoriasis.

Only in recent years have more potent irradiated ergosterol products been available and been found to be apparently therapeutically safe (*7*, *8*, *9*, *10*, *11*, *12*). Massive doses which were previously considered hazardous have been administered to a large number of patients afflicted with arthritis and numerous other conditions without any apparent ill effect. Bills, in his review article (*13*), states that the unfortunate experience with certain irradiated ergosterol products in the past was found to be due to the presence of a toxic substance (toxisterol) which has since been eliminated in modern commercial products. Furthermore, reports in the literature show that the deleterious effect of massive doses of irradiated ergosterol have occurred in children and experimentally in rats (*14*). The fact has been revealed, however, that subjects of both these classes are much more sensitive to the substance than adults, either of the animal or human species (*15*).

While employing massive doses of vitamin D, averaging 300,000 units daily, in the treatment of a series of cases afflicted with chronic arthritis, a complete involution of a wide-spread chronic psoriatic process occurred in an individual afflicted with both conditions. This

suggested further application, and since April 1936 we have applied this treatment in 15 cases of chronic wide-spread psoriasis; in 3 of the patients the process was universally distributed over the entire body.

Individual case reports will be omitted here for the sake of brevity, but all patients were between the ages of 30 and 50. Two of the 15 were female, and the remaining 13 were males. In all cases the psoriasis had existed for several years, in some as long as 20 years, and was resistant to numerous remedies and without conspicuous spontaneous involution. No local treatment of the lesions or any other measure was employed while the patient was receiving this mode of treatment, nor did the patients receive any dietary treatment. Those who were being treated during the summer months were protected from natural sunlight radiation as much as possible. Each patient received 300,000 to 400,000 units of irradiated ergosterol (vitamin D) by mouth daily. In the first 12 subjects the product used was that manufactured by the Winthrop Chemical Co., prepared in capsules reported to contain 50,000 units of pure crystalline vitamin D in 5 minims of sesame oil. This will be designated as "Product A" throughout the paper. In the last 3 cases of the series, irradiated ergosterol standardized to the same potency and prepared in the same manner by the Mead Johnson Co.[3] (and hereafter designated as "Product B"), was administered.

In the first group, treated with Product A, 10 of the 12 cases showed a complete involution within 6 to 12 weeks' time. In the second group of 3, treated by Product B, only 1 of the 3 showed a complete involution, while the remaining 2 obtained only partial improvement within 10 weeks of observation. The capsules were taken between meals to avoid any augmented action that might occur with milk products, as suggested by Lewis (*16*). There were no untoward reactions during the course of treatment of these particular subjects, with the exception of three individuals who developed the suggested evidence of hyper-vitaminosis D, characterized by anorexia, nausea, malaise, and urinary frequency, after 10 to 12 weeks of treatment. However, they had obtained their benefit by that time, and treatment was about to be discontinued. These reactions were mild and caused no alarm or disability.

All subjects were examined carefully before treatment was begun. Roentgenograms of the chests were made of all subjects, and only those who were free from significant healed calcified tuberculosis were treated, in order to avoid mobilization of this important calcified process; although Spies (*17*) suggests that large doses of irradiated ergosterol promote the calcification of tubercles rather than the contrary. After institution of treatment, blood calcium determina-

[3] This product was very kindly supplied by the Wisconsin Alumni Research Foundation.

tions and urinalyses were performed at weekly intervals. All patients but one slowly and progressively developed a hypercalcemia. The maximum range varied from 12 to 16 mg percent.

In the first group, treated by Product A, 10 of whom received marked benefit from the treatment, 6 patients experienced the return of the psoriasis within from 6 weeks to 5 months after discontinuance of treatment. The recurrence was gradual; in most instances, it did not return to the same degree of severity as existed prior to the course of treatment. There was no recurrence in the 4 remaining patients, who have been observed for periods ranging from 3 to 8 months.

Only one of the group of those who had a recurrence has been subjected to a repeated course of treatment. He has experienced 2 such attacks after an approximate interval of freedom of 2 to 3 months, but the process was limited to the scalp on the first and second recurrence. He obtained equally good results by a repeated course of treatment of 8 to 10 weeks' duration on each occasion. The one subject who enjoyed complete involution when treated by Product B was treated too recently to have developed a recurrence and to evaluate in this fashion.

We do not know as yet what constitutes a minimal therapeutic dose. In this original series all patients received at least 300,000 units daily, as we wished to be certain that an adequate quantity was being given. After involution has been produced, a small maintenance dose may be necessary. There are various methods of preparing irradiated ergosterol concentrates, and at least 6 components have been identified as being produced by irradiation of ergosterol (*18*). It may be possible that the effective antipsoriatic element is lacking or present in minimal quantity in some products, dependent upon their mode of preparation. This, of course, is a conjecture on our part; but until various products have been employed, we feel that reservation as to their efficacy in psoriasis is indicated.

SUMMARY

A preliminary report is given of a series of 15 cases of chronic, widespread psoriasis which were treated by 300,000 to 400,000 units of vitamin D from irradiated ergosterol daily; 12 were treated by one product and 3 by another. Eleven subjects obtained a complete involution in a maximum of 12 weeks, while 2 obtained only partial benefit and 2 showed no benefit. Massive doses of the preparations used appear to be relatively safe when administered to adults. This study so far suggests that this is a practical, simple, and effective treatment for the control of psoriasis.

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PULMONARY TUMORS IN MICE

IV. Lung Tumors Induced by Subcutaneous Injection of 1:2:5:6-Dibenzanthracene in Different Media and by its Direct Contact with Lung Tissues

By H. B. ANDERVONT, *Biologist, United States Public Health Service*

In previous publications (*1*, *2*) it was shown that the lungs of strain A mice and their offspring are especially susceptible to the carcinogenic action of 1:2:5:6-dibenzanthracene when a lard solution of the compound is administered subcutaneously. It has also been shown (*3*) that subcutaneous or intravenous injection of a dog-serum or horse-serum dispersion of the hydrocarbon induces pulmonary tumors in mice. During the course of these latter experiments it was noted that the lungs of mice receiving the serum injections subcutaneously contained more growths than those given an equal amount of the carcinogenic agent as a lard solution. This observation led to an experiment in which strain A mice were given equal quantities of the hydrocarbon in four different media in order to determine what influence the procedure might exert upon the subsequent appearance of pulmonary growths.

EXPERIMENT 1

One hundred and thirty female strain A mice, all of which were 3 months of age, were used in this experiment. They were divided into 5 groups and given the compound as described below. All injections were given subcutaneously in the right axillary region.

Group A.—Twenty mice each received a cholesterol pellet containing 5 percent of 1:2:5:6-dibenzanthracene, prepared according to the technique described by Shear (7). Each pellet weighed from 20 to 30 mg; hence, each contained from 1 to 1.5 mg of the hydrocarbon.

Group B.—Thirty mice were each given 0.25 cc of a lard solution containing 1 mg of the hydrocarbon.

Group C.—Thirty mice each received 0.25 cc of a 50 percent solution of glycerine in water in which was suspended 1 mg of crystalline 1:2:5:6-dibenzanthracene.

Group D.—Twenty mice each received 1 cc of a horse-serum dispersion containing 1 mg of the compound. The dispersion was prepared in these laboratories by Doctor Lorenz.

Group E.—Thirty mice were set aside as untreated controls.

The injections were given on August 14, 1936. Between that time and September 24, 1936, 7 mice of group B and 10 mice of group C were used for other experimental purposes; none had lung growths. On October 15, 1936, 2 more mice of both group B and group C were killed for other purposes and all 4 had several small nodules within their lungs.

On November 7, 1936, 5 mice of each of the 4 experimental groups were killed and autopsied, and 1 week later (3 months after the time of injection) all surviving mice were killed and their lungs examined for the presence of macroscopic tumor growth. The results of the experiment are presented in table 1.

TABLE 1.—*Experiment 1: Pulmonary growths induced in strain A mice by the subcutaneous injection of 1 mg of 1:2.5:6-dibenzanthracene in various media*

Group	Preparation used	Number of mice used	Used experimentally from Aug 14, 1936, to Nov 7, 1936	Killed Nov 7-14, 1936			
				Number killed	Results		Average number of nodules counted in positive lungs
					Negative	Positive	
A	Cholesterol pellet	20	0	20	7	13	2
B	Lard solution	30	9	21	2	19	14
C	Glycerin-suspension	30	12	18	1	17	13
D	Serum dispersion	20	0	20	0	20	30+
E	Untreated controls	30	0	30	27	3	1

It is seen that, of the experimental mice, 13, or 65 percent, of group A, 19, or 90 percent, of group B, 17, or 94 percent, of group C, and all of group D had induced pulmonary tumors, while of the controls 3, or 10 percent, had spontaneous pulmonary growths. While examining the lungs it was noted that the mice of group C had many more nodules within their lungs than did those of the other 4 groups. In order to demonstrate this quantitative difference, it was necessary to count the number of nodules on the surface of each positive set of lungs and to determine the average number of nodules per mouse by

dividing the total number observed by the number of mice with induced lung tumors. These averages are shown in the last column of table 1. An average of 30 plus was given to group D because the nodules were too numerous to count with certainty. It is clear that the horse-serum dispersion was more effective in invoking lung growths than any of the other preparations.

These results suggest that 1:2:5:6-dibenzanthracene, when injected subcutaneously into susceptible mice, induces more lung tumors when injected as a fine suspension in a medium which is capable of leaving the site of injection. It would appear reasonable to assume that when injected as a dispersion in serum, more of the compound became distributed throughout the body of the animal than when injected as a lard solution or a glycerine suspension. It is obvious that the greater part of the lard remained at the injection site while most of the crystals suspended in glycerine were much larger than those of the serum dispersion. However, both the lard solution and glycerine suspension induced a considerable number of lung growths. The reason for the appearance of approximately the same number of lung tumors in mice receiving these last two preparations is not clear. Some of the lard solution probably left the site of injection and reached the lungs by means of the blood stream. In the same manner some of the crystals injected in glycerine might have been dissolved in the body fluids and carried to the lungs, or small crystals might have been carried to the lungs as such. It is known that small crystals of the compound were in the lard solution; for in this laboratory Lorenz has found that, when a solution of 1:2:5:6-dibenzanthracene in lard containing 4 mg of the compound in each cc of lard is examined microscopically or even macroscopically in fluorescent light, many small dibenzanthracene crystals are present, the size depending upon the rate of cooling of the heated solution.

It is essential to note that in the case of those mice receiving pellets, their tissues came into contact only with the amount of hydrocarbon present upon the surface of the pellet. Therefore, the results obtained with the mice of group A may be regarded as showing that the presence alone of 1:2:5:6-dibenzanthracene within the body was not sufficient to induce many lung growths within the limits of this experiment. The results of experiment 1 suggest that lung tumors might be induced by the carcinogenic agent acting directly upon the lung tissue.

In the experiment just described, 3 months elapsed between the time of injection and the time the mice were autopsied. Previous investigations (*1*) had also shown that a period of 3 months is sufficient to induce lung nodules in practically every strain A mouse injected subcutaneously with 0.8 mg of 1:2:5:6-dibenzanthracene as a lard solution. This period is considerably less than the latent period between subcutaneous injection of strain A mice with larger amounts of the agent and the appearance of tumors at the site of injection. If the

lung tumors were produced by a direct action of the agent upon lung tissue, it should be possible to induce them in strain A mice within 3 months after the introduction of 1:2:5:6-dibenzanthracene directly into their lungs.

With this end in view, a method was devised for inserting the compound into the lungs. Silk threads about 150 mm in length were dipped into molten 1:2:5:6-dibenzanthracene so that one end was covered for a distance of about 5 mm, which provided a coating of the solid compound containing approximately 1 mg on each thread. They were then threaded into a fine needle and sterilized by boiling. Mice were anesthetized by an intraperitoneal injection of nembutal and the needle was passed through the chest cavity by inserting it through the front of the chest wall between the ribs, so as to miss the heart, and extruded through the rear of the chest wall close to the vertebral column. The thread was then drawn through the mouse until the coated end had disappeared from view into the pleural cavity and the end protruding from the mouse's back cut as close to the skin as possible. This procedure was found to be satisfactory in placing the coated thread within the lungs of about 60 percent of the experimental animals.

EXPERIMENT 2

On November 10, 1936, threads coated with the hydrocarbon were inserted through the chest cavity of 22 strain A, 7 strain C_3H and 6 strain C57 black mice. All the animals were approximately 2½ months old. Strain C_3H mice were used because earlier investigations *(3)* had shown their lungs to be susceptible to induced growths and the C57 blacks were employed because of their resistance to all types of spontaneous growths. The mice were sacrificed at different intervals during the course of the experiment and their lungs examined for the presence of the coated thread. If the thread had pierced the lungs the area surrounding the thread was fixed and prepared for histological examination. In the interest of clarity and brevity, the results of this experiment are presented in table 2.

TABLE 2.—*Experiment 2: Results obtained by inserting thread coated with 1 mg of 1:2:5:6-dibenzanthracene directly into lungs of mice*

Strain of mice	Number killed	Date killed	Time in weeks after insertion of thread	Number in which thread had missed lungs	Results of histological findings in lungs pierced by coated thread: Reaction tissue only	Adenoma	Adeno-carcinoma	Squamous cell carcinoma
A	2	Jan. 22, 1937	10		1	1		
A	9	Jan. 28, 1937	11	1	2	4	1	1
C_3H	7	do	11	4	1	1		1
A	11	Feb. 17, 1937	14	7		1		3
C57 black	6	Feb. 23, 1937	15	2	2	1	1	

It is seen that 1:2:5:6-dibenzanthracene induced tumor growth in the lungs of all three strains of mice and that the growths appeared in both strain A and strain C_3H mice within 3 months after the agent had been placed in their lungs (figs. 1 and 2).

The production of tumors within the lungs of strain C57 black mice is of interest, for these mice are known to be resistant to the development of spontaneous tumors, and in this laboratory their lungs have thus far proved to be very resistant to tumors induced by the subcutaneous injection of lard-dibenzanthracene solutions. Hence the results obtained in experiment 2 with this strain of mice suggest that tumors can be induced in the lungs of various strains of mice regardless of their genetic constitution, and that the variation in susceptibility of different strains of mice to induced lung tumors is a matter of degree. It is known (*4*) that the subcutaneous tissues of different inbred strains of mice are susceptible to the carcinogenic power of dibenzanthracene, and in all probability the same is true for their lung tissue.

The fact that all inbred strains of mice are responsive to the carcinogenic activity of relatively large amounts of 1:2:5:6-dibenzanthracene does not lessen the importance of recognizing the part played by their genetic constitutions in the appearance of spontaneous tumors. Indeed, the pronounced variation in susceptibility to lard solutions of 1:2:5:6-dibenzanthracene shown by different strains of mice (*6*) is further evidence of differences in their susceptibility to tumor growth.

Histological studies of the induced lung growths revealed that the compound induced a variety of malignant changes within the tissues of the lung (fig. 3). Adenomatous growths were the most common; but adenocarcinomas and squamous-cell carcinomas were also observed, while in most of the sections studied, two or all three of these types of growth were seen. Furthermore, among the carcinomatous elements in some lungs were found areas of hypertrophied connective tissue cells containing large nuclei and nucleoli and strongly resembling sarcoma. The predominating types of growth observed in the sections studied are listed in table 2.

An area of tumor growth surrounding a thread in one strain A mouse has undergone six serial passages in the subcutaneous tissues of mice of the same strain (lung tumor J). Histological preparations of the primary induced growth contained an area of squamous-cell carcinoma with keratin formation and several adenomas (fig. 4). Sections of the first passage of this tumor consist mostly of squamous cells with a stroma formation suggesting sarcoma. The second passage tumor is a mixed tumor (fig. 5) for both squamous cells with keratin formation and sarcomatous tissues are seen, while section of the third passage consists mostly of sarcoma cells. The tumor has

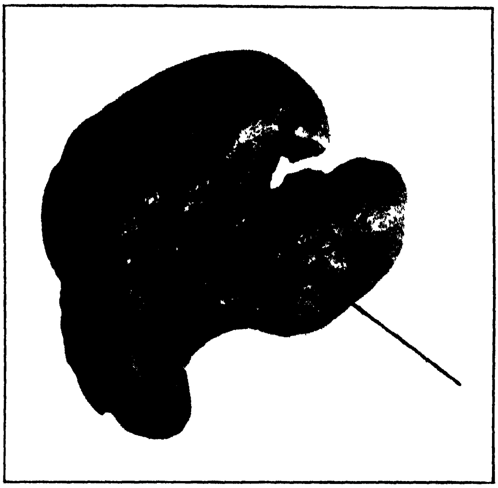

FIGURE 1 — A lung tumor induced in a strain A mouse within 11 weeks after insertion of a thread coated with solid 1 2 5 6-dibenzanthracene The arrow points to the thread which is surrounded by the growth.

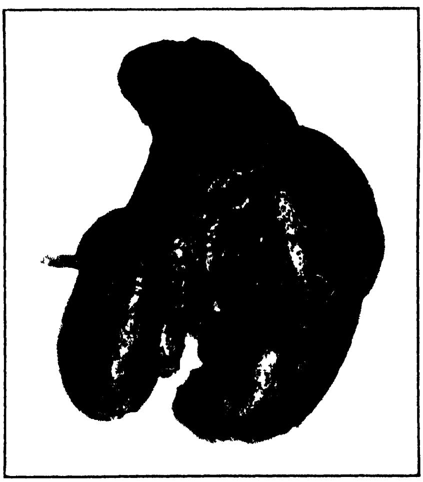

FIGURE 2 — Another view of the same lungs as in figure 1, showing the thread extruding from the induced tumor

FIGURE 3.—Showing lung area around a thread in a C57 black mouse. The thread had been withdrawn before the tissue was fixed. The space occupied by the thread is seen surrounded by reaction tissue and tumor tissue. (× 75.)

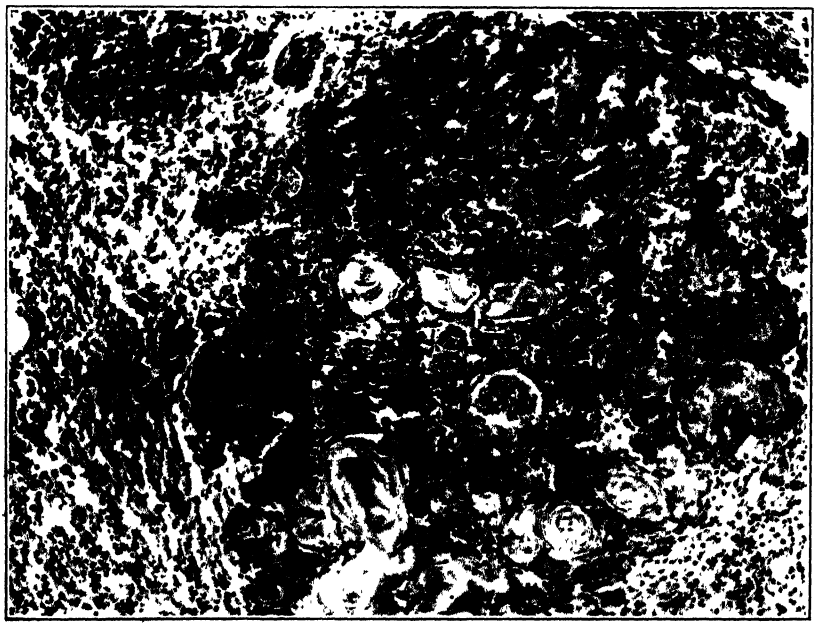

FIGURE 4.—Lung tumor J, showing the primary induced squamous-cell carcinoma. (× 200.)

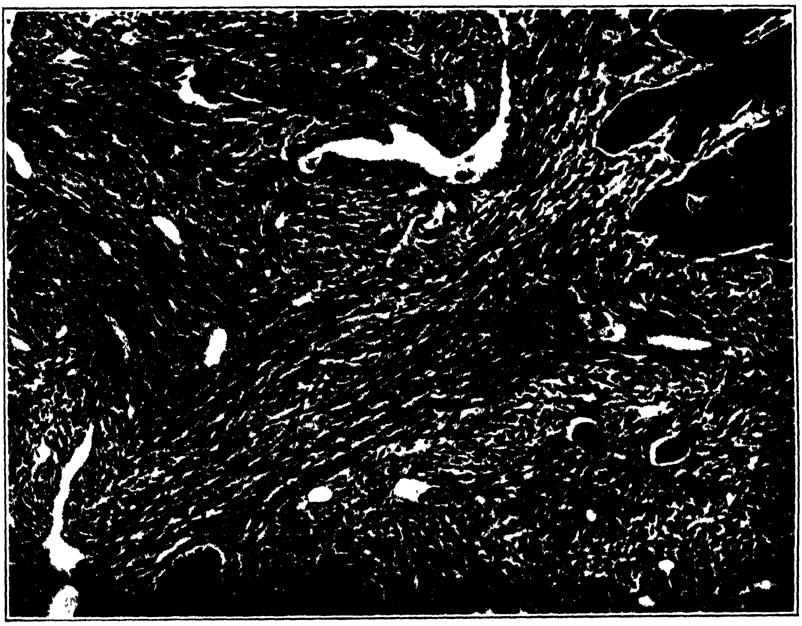

FIGURE 5.—Lung tumor J, second passage, showing mixed tumor consisting of sarcomatous tissue and squamous cells (× 200.)

continued to grow as a sarcoma in all subsequent passages. This sequence of events is similar to that observed previously (*6*) during the serial transplantation of other induced lung tumors in strain A mice.

SUMMARY

When 1:2:5:6-dibenzanthracene was injected subcutaneously into strain A mice in different media, namely, a dispersion in horse serum, a solution in lard, a suspension in glycerine, and a solid solution in cholesterol, it was found that the horse-serum dispersion induced the most pulmonary growths.

Lung tumors were induced in mice of strain A, strain C_3H, and strain C57 black by inserting 1:2:5:6-dibenzanthracene directly into their lungs.

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DEATHS DURING WEEK ENDED OCT. 16, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct 16, 1937	Corresponding week, 1936
Data from 86 large cities in the United States		
Total deaths	7,844	7,798
Average for 3 prior years	7,509	
Total deaths, first 41 weeks of year	351,506	354,217
Deaths under 1 year of age	525	556
Average for 3 prior years	513	
Deaths under 1 year of age, first 41 weeks of year	22,825	22,863
Data from industrial insurance companies		
Policies in force	69,971,510	68,617,638
Number of death claims	9,912	9,933
Death claims per 1,000 policies in force, annual rate	7.4	7.6
Death claims per 1,000 policies, first 41 weeks of year, annual rate	9.8	9.9

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (------) indicate that cases or deaths may have occurred although none was reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 23, 1937, and Oct. 24, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct 23, 1937	Week ended Oct 24, 1936	Week ended Oct 23, 1937	Week ended Oct 24, 1936	Week ended Oct 23, 1937	Week ended Oct. 24, 1936	Week ended Oct 23, 1937	Week ended Oct 24, 1936
New England States:								
Maine	3	6	3	------	18	14	0	0
New Hampshire	------	1	------	------	4	------	0	1
Vermont	2	------	------	------	3	------	0	0
Massachusetts	------	3	------	------	18	47	1	4
Rhode Island	------	------	------	------	------	96	0	0
Connecticut	9	2	2	------	5	8	0	0
Middle Atlantic States:								
New York	26	14	[1] 12	[1] 7	91	52	10	7
New Jersey	11	20	5	7	57	41	0	2
Pennsylvania	27	23	------	------	436	29	1	6
East North Central States:								
Ohio	39	34	4	8	163	5	9	5
Indiana	25	35	14	10	5	2	0	3
Illinois	38	32	11	6	127	17	3	3
Michigan	24	22	------	2	39	20	1	2
Wisconsin	10	3	33	16	19	19	0	1
West North Central States:								
Minnesota	19	6	------	------	6	8	0	1
Iowa	2	4	------	------	3	5	0	0
Missouri	41	11	27	130	107	------	2	0
North Dakota	2	------	------	9	------	------	1	0
South Dakota	------	------	------	------	------	1	0	0
Nebraska	6	2	------	------	1	2	1	1
Kansas	5	14	3	------	4	1	0	0
South Atlantic States:								
Delaware	4	5	------	8	------	9	0	0
Maryland [2] [3]	7	15	13	4	3	6	3	0
District of Columbia	5	7	2	2	3	8	3	1
Virginia	77	67	------	------	29	4	0	4
West Virginia	47	42	8	11	26	1	2	1
North Carolina [3]	122	180	3	10	80	13	2	0
South Carolina [3]	15	14	140	114	26	9	1	0
Georgia [3]	25	32	------	------	------	------	0	0
Florida [3]	20	20	2	4	2	2	1	0
East South Central States:								
Kentucky	32	41	9	12	60	93	7	4
Tennessee	67	68	27	38	8	2	3	0
Alabama [3]	30	34	17	20	6	------	2	2
Mississippi [3]	17	17	------	------	------	------	1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 23, 1937, and Oct. 24, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct 23, 1937	Week ended Oct 24, 1936	Week ended Oct 23, 1937	Week ended Oct 24, 1936	Week ended Oct 23 1937	Week ended Oct 24, 1936	Week ended Oct 23, 1937	Week ended Oct 24, 1936
West South Central States:								
Arkansas	28	7	13	6	6		0	0
Louisiana [3]	7	29	9	23		1	0	1
Oklahoma [4]	17	16	21	40	2	1	1	3
Texas [3]	36	27	123	92	22	4	2	0
Mountain States:								
Montana		1		12	2	2	0	0
Idaho	1		1	8	19	45	0	1
Wyoming		1					0	0
Colorado	10	10			29	2	3	2
New Mexico	3	5	1		30	35	1	0
Arizona	6	8	40	22	1	11	0	0
Utah [2]					63	8	1	1
Pacific States								
Washington	1				6	5	2	1
Oregon		3	15	26	4	6	0	1
California	42	45	22	30	33	46	3	2
Total	908	926	580	672	1,566	680	67	60
First 42 weeks of year	19,559	20,247	278,638	143,607	249,260	270,770	4,672	6,406

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers	
	Week ended Oct 23, 1937	Week ended Oct 24 1936	Week ended Oct 23, 1937	Week ended Oct 24, 1936	Week ended Oct 23, 1937	Week ended Oct 24, 1936	Week ended Oct 23, 1937	Week ended Oct 24, 1936
New England States								
Maine	3	0	12	10	0	0	2	2
New Hampshire	1	0	2		0	0	2	0
Vermont	0	0	5	3	0	0	1	1
Massachusetts	6	4	106	92	0	0	3	1
Rhode Island	0	0	23	17	0	0	1	1
Connecticut	4	2	31	34	0	0	2	6
Middle Atlantic States.								
New York	29	10	215	237	0	0	18	21
New Jersey	5	1	51	37	0	0	3	4
Pennsylvania	6	4	230	233	0	0	37	20
East North Central States								
Ohio	2	21	186	139	1	0	17	18
Indiana	0	2	120	91	2	0	8	11
Illinois	10	45	194	192	0	2	11	27
Michigan	12	15	267	154	0	0	1	14
Wisconsin	13	0	76	150	0	0	4	6
West North Central States								
Minnesota	20	1	78	78	3	3	0	1
Iowa	11	4	76	52	7	2	7	6
Missouri	10	3	163	67	7	0	0	19
North Dakota	2	1	14	16	5	1	1	0
South Dakota	2	0	10	43	0	2	1	0
Nebraska	14	2	13	25	0	2	1	0
Kansas	6	8	107	71	0	0	0	5
South Atlantic States.								
Delaware	0	0	6	4	0	0	0	5
Maryland [2 3]	1	1	44	52	0	0	8	17
District of Columbia	1	0	5	11	0	0	3	3
Virginia	1	1	42	41	0	0	4	25
West Virginia	1	7	72	76	1	0	10	17
North Carolina [3]	3	2	68	91	0	1	10	10
South Carolina [3]	2	2	14	14	0	0	5	13
Georgia [3]	0	7	37	31	0	1	7	29
Florida [3]	0	1	8	5	0	0	2	3

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 23, 1937, and Oct. 24, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers	
	Week ended Oct 23, 1937	Week ended Oct 24, 1936	Week ended Oct 23, 1937	Week ended Oct 24, 1936	Week ended Oct 23, 1937	Week ended Oct 24, 1936	Week ended Oct 23, 1937	Week ended Oct 24, 1936
East South Central States:								
Kentucky	2	9	85	49	3	0	3	27
Tennessee	3	14	55	64	3	0	19	17
Alabama [3]	1	1	12	27	0	0	3	4
Mississippi [2]	12	2	10	19	0	0	6	9
West South Central States:								
Arkansas	8	4	20	7	0	0	7	5
Louisiana [3]	5	0	8	15	0	0	14	15
Oklahoma [4]	2	2	35	5	1	0	13	13
Texas [3]	12	4	66	22	1	1	46	13
Mountain States:								
Montana	0	0	16	140	3	19	1	6
Idaho	1	0	32	41	3	2	3	8
Wyoming	1	0	10	12	0	1	1	2
Colorado	6	0	20	27	1	1	3	0
New Mexico	2	1	20	20	0	0	10	32
Arizona	0	0	7	15	0	0	5	0
Utah [2]	0	0	25	12	0	0	2	0
Pacific States								
Washington	3	3	21	34	30	0	3	3
Oregon	2	2	10	25	4	0	3	4
California	17	8	169	153	15	0	10	12
Total	242	197	2,896	2,756	90	38	330	455
First 42 weeks of year	8,675	3,534	180,486	192,662	8,546	6,262	12,966	12,204

[1] New York City only.
[2] Week ended earlier than Saturday
[3] Typhus fever, week ended Oct 23, 1937, 58 cases, as follows Maryland, 1, North Carolina, 2; South Carolina, 1, Georgia, 26, Florida, 2, Alabama, 11, Louisiana, 2, Texas, 13.
[4] Figures for 1936 are exclusive of Oklahoma City and Tulsa

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September 1937										
Florida	5	55	2	188	29	6	8	6	0	16
Georgia	2	127	36	640	4	33	10	86	0	53
Illinois	8	106	32	24	178		381	474	2	109
Indiana	4	42	45		29		49	149	8	19
Kansas	6	17	13	4	54		116	211	1	27
Louisiana	3	48	18	167	7	10	29	29	0	99
Maryland	7	37	16	3	19	1	35	102	0	67
Massachusetts	2	7		3	45	4	142	169	0	19
Michigan	7	72	5	39	74		204	494	4	43
Minnesota	3	24	1		24		176	112	12	27
Nevada					2		1	12	0	0
New York	18	46		10	360		290	381	0	108
North Dakota	3	3	8		5		4	16	5	5
Ohio	10	97	48	3	242		178	548	0	250
Oklahoma	3	38	95	322	6	7	82	49	4	63
Rhode Island	1	4			7		13	38	0	3
South Dakota	3	2	6		5		16	33	5	9
Virginia	5	127	96	43	42	12	14	57	1	68

Summary of monthly reports from States—Continued

September 1937

	Cases
Actinomycosis	
Michigan	3
Anthrax	
Minnesota	1
Oklahoma	1
South Dakota	1
Chicken pox	
Florida	2
Georgia	4
Illinois	105
Indiana	16
Kansas	21
Louisiana	8
Maryland	13
Massachusetts	67
Michigan	146
Minnesota	40
Nevada	3
New York	192
North Dakota	9
Ohio	70
Rhode Island	6
South Dakota	12
Virginia	13
Conjunctivitis:	
Georgia	15
Illinois	1
Dengue	
Florida	2
Georgia	3
Diarrhea	
Kansas	2
Maryland	61
Ohio (under 2 years, enteritis included)	56
Dysentery	
Florida	23
Georgia (amoebic)	9
Georgia (bacillary)	13
Illinois (amoebic)	7
Illinois (amoebic carriers)	21
Illinois (bacillary)	70
Kansas (bacillary)	3
Louisiana (amoebic)	14
Louisiana (bacillary)	2
Maryland (bacillary)	50
Massachusetts (bacillary)	9
Michigan (amoebic)	3
Michigan (bacillary)	4
Minnesota (amoebic)	3
Minnesota (bacillary)	2
New York (amoebic)	11
New York (bacillary)	141
Ohio (amoebic)	1
Ohio (bacillary)	4
Oklahoma	34
Virginia (diarrhea included)	255
Encephalitis, epidemic or lethargic.	
Illinois	25
Kansas	13
Louisiana	1
Massachusetts	1
Minnesota	4
New York	18
North Dakota	6
Ohio	5
Oklahoma	1
South Dakota	18
German measles:	
Illinois	26
Kansas	6
Maryland	4
Massachusetts	22
Michigan	39
New York	49
Ohio	19
Rhode Island	3

September 1937—Continued

	Cases
Hookworm disease	
Florida	586
Georgia	484
Louisiana	92
Impetigo contagiosa	
Kansas	2
Maryland	26
Lead poisoning	
Illinois	2
Massachusetts	1
Michigan	1
Ohio	4
Mumps	
Florida	25
Georgia	26
Illinois	115
Indiana	4
Kansas	111
Louisiana	3
Maryland	8
Massachusetts	100
Michigan	143
Nevada	1
Ohio	39
Oklahoma	4
Rhode Island	2
South Dakota	7
Virginia	57
Ophthalmia neonatorum:	
Maryland	1
Massachusetts	71
New York [1]	8
Ohio	58
Virginia	2
Paratyphoid fever	
Florida	2
Georgia	2
Illinois	9
Kansas	1
Louisiana	2
Maryland	2
Massachusetts	25
Michigan	10
New York	18
Ohio	1
Virginia	1
Puerperal septicemia	
Georgia	1
Ohio	1
Rabies in animals.	
Illinois	18
Indiana	41
Louisiana	9
Massachusetts	17
Michigan	6
New York [1]	3
Rhode Island	1
Rabies in man	
Florida	2
Rocky Mountain spotted fever	
Maryland	3
Ohio	1
Virginia	3
Scabies	
Maryland	1
Oklahoma	2
Septic sore throat.	
Georgia	38
Illinois	5
Indiana	2
Kansas	3
Louisiana	11
Maryland	6
Massachusetts	6
Michigan	9
Minnesota	4
New York	35
Ohio	58
Oklahoma	28
Rhode Island	5

September 1937—Continued

	Cases
Septic sore throat—Cont.	
South Dakota	1
Virginia	3
Tetanus	
Georgia	1
Illinois	8
Kansas	1
Louisiana	2
Maryland	2
Massachusetts	5
Michigan	7
New York	1
Ohio	4
Oklahoma	2
Trachoma	
Illinois	49
Louisiana	8
Oklahoma	8
Virginia	1
Trichinosis	
Massachusetts	1
Michigan	3
New York	88
Ohio	1
Tularaemia	
Illinois	1
Minnesota	3
Nevada	1
Ohio	3
Oklahoma	1
Typhus fever	
Florida	22
Georgia	122
Louisiana	5
New York	2
Oklahoma	1
Undulant fever	
Florida	2
Georgia	2
Illinois	8
Kansas	12
Louisiana	8
Maryland	9
Massachusetts	3
Michigan	9
Minnesota	10
Nevada	1
New York	20
Ohio	5
Oklahoma	29
Rhode Island	3
South Dakota	1
Virginia	4
Vincent's infection	
Florida	10
Illinois	19
Kansas	9
Maryland	7
Michigan	15
New York [1]	68
Oklahoma	4
Whooping cough	
Florida	40
Georgia	109
Illinois	569
Indiana	156
Kansas	199
Louisiana	41
Maryland	397
Massachusetts	585
Michigan	1,017
Minnesota	231
Nevada	8
New York	1,398
North Dakota	157
Ohio	710
Oklahoma	37
Rhode Island	241
South Dakota	98
Virginia	157

[1] Exclusive of New York City.

PLAGUE INFECTION IN FRESNO COUNTY, CALIF.

Under dates of October 20 and 22, 1937, Dr. W. M. Dickie, director of public health of California, reported plague infection proved by animal inoculation in a pool of organs from 14 chipmunks collected October 2 in the Billy Creek area, Huntington Lake district, Fresno County, Calif.; in a pool of 9 fleas from 1 *beecheyi* squirrel found September 13 on Fresno State College property, Huntington Lake; and in a pool of 197 fleas from 56 *beecheyi* squirrels collected September 20 at Lake Shore resort and at Huntington dump, 2 miles east of Huntington Lake.

WEEKLY REPORTS FROM CITIES

City reports for week ended Oct. 16, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities											
5-year average	260	119	25	146	414	739	6	352	72	781	-------
Current week	161	91	35	298	473	589	3	301	56	673	-------
Maine											
Portland	0	------	0	0	3	0	0	1	0	4	23
New Hampshire:											
Concord	0	------	0	2	4	1	0	1	0	0	11
Manchester	0	------	0	0	0	0	0	0	0	0	10
Nashua	0	------	0	0	0	0	0	0	0	2	3
Vermont											
Barre	0	------	0	5	0	0	0	0	0	0	4
Burlington	0	------	0	0	0	0	0	0	0	0	7
Rutland	0	------	0	0	0	0	0	0	0	4	4
Massachusetts											
Boston	0	------	0	8	16	23	0	5	0	10	180
Fall River	0	------	0	0	2	4	0	0	0	10	24
Springfield	0	------	0	1	0	1	0	0	0	7	30
Worcester	0	------	0	1	2	2	0	1	0	2	45
Rhode Island											
Pawtucket	0	------	0	0	0	1	0	0	0	0	20
Providence	1	1	0	1	7	7	0	0	0	21	66
Connecticut											
Bridgeport	0	------	1	1	5	4	0	0	0	0	36
Hartford	1	------	0	0	2	6	0	0	0	0	39
New Haven	0	------	0	0	0	2	0	0	0	0	29
New York											
Buffalo	0	------	1	1	7	9	0	6	0	11	139
New York	19	8	4	29	91	31	0	64	12	79	1,375
Rochester	0	1	0	0	5	2	0	2	0	0	74
Syracuse	0	------	0	0	7	4	0	0	0	1	60
New Jersey:											
Camden	0	------	0	0	0	1	0	1	0	0	39
Newark	1	------	0	0	5	3	0	6	0	18	94
Trenton	1	1	0	23	0	3	0	1	1	3	40
Pennsylvania											
Philadelphia	1	3	0	4	23	27	0	23	8	30	467
Pittsburgh	5	4	2	49	12	30	0	7	1	15	137
Reading	0	------	0	1	1	0	0	2	0	0	26
Scranton	1	------	-------	8	-------	3	0	-------	0	5	-------

City reports for week ended Oct. 16, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Ohio:											
Cincinnati	5	------	2	3	7	5	0	5	2	9	128
Cleveland	0	8	2	14	12	35	0	9	3	25	182
Columbus	1	------	0	0	3	13	0	3	0	1	82
Toledo	2	1	1	3	2	5	0	2	0	15	62
Indiana:											
Anderson	0	------	0	4	1	9	0	0	0	1	11
Fort Wayne	0	------	0	0	2	2	0	0	0	0	18
Indianapolis	2	------	0	4	9	18	0	0	1	9	92
Muncie	0	------	0	0	1	0	0	0	0	0	14
South Bend	0	------	1	0	0	0	0	0	0	0	20
Terre Haute	0	------	0	0	0	3	0	0	0	0	14
Illinois:											
Alton	0	------	0	5	0	2	0	0	0	0	5
Chicago	11	2	2	23	35	51	0	31	3	54	660
Elgin	0	------	0	0	0	3	0	0	0	0	8
Moline	0	------	0	2	3	1	0	0	0	2	7
Springfield	0	------	0	0	2	2	0	0	0	0	23
Michigan:											
Detroit	13	------	0	17	27	52	0	16	1	46	242
Flint	0	------	0	2	3	8	0	0	0	7	34
Grand Rapids	1	------	0	4	4	11	0	0	0	5	38
Wisconsin:											
Kenosha	0	------	0	0	0	4	0	0	0	2	8
Madison	0	------	0	0	0	0	0	0	0	3	26
Milwaukee	0	------	0	10	1	9	0	6	0	44	92
Racine	0	------	0	1	0	2	0	0	0	1	6
Superior	0	------	0	0	1	0	0	0	0	3	7
Minnesota:											
Duluth	0	------	0	0	2	3	0	0	0	11	25
Minneapolis	2	------	0	1	6	17	0	1	0	11	99
St. Paul	8	------	0	1	8	1	0	4	0	5	66
Iowa:											
Cedar Rapids	0	------	------	0	------	0	0	------	0	6	------
Davenport	0	------	------	0	------	1	0	------	0	0	------
Des Moines	0	------	------	0	------	8	0	------	0	0	30
Sioux City	0	------	------	0	------	2	0	------	0	4	------
Waterloo	0	------	------	0	------	5	0	------	0	0	------
Missouri:											
Kansas City	1	------	0	0	9	7	0	6	0	2	97
St. Joseph	0	------	0	0	5	6	0	0	0	0	32
St. Louis	11	------	0	55	3	43	0	2	3	2	202
North Dakota:											
Fargo	0	------	0	0	1	1	0	0	0	18	9
Grand Forks	0	------	------	0	------	8	0	------	0	0	------
Minot	1	------	0	0	0	1	0	0	0	1	4
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	1	------
Nebraska:											
Lincoln	0	------	------	1	------	2	0	------	0	1	------
Omaha	1	------	0	2	3	1	0	0	1	0	56
Kansas:											
Lawrence	0	------	0	0	0	0	0	0	0	0	3
Topeka	0	------	1	0	2	6	0	0	0	5	26
Wichita	1	------	0	1	4	6	0	0	2	9	25
Delaware:											
Wilmington	1	------	0	0	3	5	0	1	0	0	26
Maryland:											
Baltimore	2	7	6	2	18	9	0	7	2	46	221
Cumberland	0	------	0	0	1	0	0	1	0	0	15
Frederick	0	------	0	0	0	0	0	0	0	0	5
Dist. of Col.:											
Washington	6	1	0	1	7	8	0	7	1	3	148
Virginia:											
Lynchburg	4	------	0	0	1	1	0	0	0	0	8
Norfolk	0	------	0	0	3	0	0	1	0	1	13
Richmond	2	------	2	0	2	3	0	2	0	0	46
Roanoke	0	4	0	0	2	0	0	0	0	2	13
West Virginia:											
Charleston	5	------	0	0	2	0	0	0	1	0	30
Huntington	1	------	------	3	------	2	0	------	0	0	------
Wheeling	0	------	0	0	1	3	0	0	0	5	26
North Carolina:											
Gastonia	2	------	------	0	------	0	0	------	0	0	------
Raleigh	0	------	0	0	1	0	0	0	0	4	11
Wilmington	0	------	0	0	0	0	0	0	0	7	11
Winston-Salem	0	------	0	0	0	2	0	1	0	0	13

City reports for week ended Oct. 16, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
South Carolina:											
Charleston	0	5	0	1	0	1	0	0	5	0	21
Columbia	0	------	0	0	0	0	0	1	0	0	19
Florence	0	------	0	0	1	1	0	0	0	0	8
Georgia:											
Atlanta	5	7	0	0	5	10	0	4	1	3	61
Brunswick	0	------	0	0	0	0	0	0	0	0	4
Savannah	3	11	1	0	0	0	0	1	0	0	27
Florida.											
Miami	0	------	--------	3	1	0	0	1	0	0	21
Tampa	0	1	1	0	0	0	0	0	1	1	19
Kentucky:											
Ashland	0	------	0	0	1	2	0	1	0	0	23
Covington	0	------	0	0	1	4	0	0	0	1	11
Lexington	0	------	0	5	0	0	0	1	0	5	21
Louisville	1	------	0	3	8	12	0	3	0	6	47
Tennessee:											
Knoxville	0	------	0	0	2	2	0	1	0	0	32
Memphis	2	------	0	3	0	4	1	2	2	2	70
Nashville	2	------	0	0	0	1	0	4	0	1	53
Alabama											
Birmingham	7	4	1	0	7	6	0	2	0	0	58
Mobile	1	------	0	0	1	2	0	0	1	0	15
Montgomery	4	------	--------	0	-------	0	0	-------	0	0	--------
Arkansas:											
Fort Smith	0	------	--------	0	-------	1	0	-------	0	3	--------
Little Rock	0	1	0	1	1	1	0	0	0	0	--------
Louisiana:											
Lake Charles	1	------	0	0	2	0	0	0	0	0	5
New Orleans	7	8	4	0	9	1	0	18	0	9	131
Shreveport	2	------	0	0	8	3	0	2	0	0	39
Oklahoma.											
Muskogee	0	------	--------	0	-------	1	0	-------	0	0	--------
Oklahoma City	2	------	0	0	1	3	0	1	1	2	42
Tulsa	0	------	--------	0	-------	8	0	-------	0	22	--------
Texas:											
Dallas	3	1	1	1	2	4	0	3	0	3	67
Fort Worth	1	------	--------	0	-------	3	0	-------	1	11	--------
Galveston	0	------	0	0	2	2	0	0	0	0	12
Houston	0	------	0	0	6	1	0	7	0	0	62
San Antonio	0	------	2	0	3	0	0	6	0	0	47
Montana:											
Billings	0	------	0	0	1	0	0	0	1	0	9
Great Falls	0	------	0	1	2	0	2	0	0	0	6
Helena	0	------	0	0	0	0	0	0	0	6	6
Missoula	0	------	0	0	0	0	0	0	2	0	7
Idaho:											
Boise	0	------	0	0	0	0	0	0	0	0	4
Colorado:											
Colorado Springs	0	------	0	1	0	2	0	0	0	2	12
Denver	4	------	0	9	9	9	0	5	0	2	84
Pueblo	0	------	0	0	1	0	0	0	1	6	8
New Mexico:											
Albuquerque	0	------	0	0	5	4	0	1	0	0	12
Utah:											
Salt Lake City	3	------	1	3	4	13	0	1	0	5	35
Washington:											
Seattle	1	------	0	0	8	3	0	1	0	10	86
Spokane	0	------	0	0	5	1	0	1	0	5	33
Tacoma	0	------	0	0	1	5	0	0	0	2	35
Oregon.											
Portland	0	------	0	2	3	2	0	2	0	1	71
Salem	0	------	--------	0	-------	0	0	-------	0	0	--------
California:											
Los Angeles	14	13	0	8	14	18	0	14	0	29	209
Sacramento	1	------	0	1	0	2	0	1	0	8	30
San Francisco	0	------	0	3	5	5	0	7	0	34	159

City reports for week ended Oct. 16, 1937—Continued

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Maine:			
Portland	0	0	2
New Hampshire:			
Nashua	0	0	1
Rhode Island:			
Providence	0	0	1
Connecticut:			
New Haven	0	0	1
New York:			
Buffalo	1	0	0
New York	5	2	7
Syracuse	0	0	1
Pennsylvania:			
Philadelphia	0	0	3
Pittsburgh	2	0	0
Ohio:			
Cincinnati	0	0	1
Cleveland	1	0	2
Indiana:			
Indianapolis	1	0	0
South Bend	0	0	1
Illinois:			
Chicago	1	1	7
Michigan:			
Detroit	0	0	6
Flint	0	1	0
Grand Rapids	0	0	1
Wisconsin:			
Milwaukee	0	0	9
Minnesota:			
Duluth	0	0	1
Minneapolis	0	0	5
St. Paul	0	0	3
Iowa:			
Sioux City	0	0	1
Missouri:			
Kansas City	0	1	1
St. Joseph	0	0	1
St. Louis	0	0	1
Nebraska:			
Omaha	0	0	2
Maryland:			
Baltimore	3	1	0
District of Columbia:			
Washington	2	1	2
Georgia:			
Atlanta	1	0	1
Kentucky:			
Ashland	1	1	0
Tennessee:			
Knoxville	1	0	0
Nashville	1	0	0
Alabama:			
Birmingham	0	1	0
Arkansas:			
Little Rock	0	0	1
Louisiana:			
New Orleans	0	0	1
Texas:			
Fort Worth	0	0	1
Houston	0	0	1
Montana:			
Missoula	0	0	2
Colorado:			
Denver	0	0	1
Pueblo	0	0	4
Utah:			
Salt Lake City	0	0	1
Washington:			
Seattle	0	0	1
Spokane	1	0	0
Oregon:			
Portland	0	0	1
California:			
Los Angeles	0	0	3
Sacramento	0	0	1
San Francisco	0	0	3

Encephalitis, epidemic or lethargic.—Cases: Providence, 1; New York, 2; St. Louis, 8; Baltimore, 1; Louisville, 1, New Orleans, 1; Denver, 1.

Pellagra.—Cases: Philadelphia, 1; Charleston, S. C., 1; Savannah, 2; Memphis, 1; Birmingham, 2.

Rabies in man.—Deaths New Orleans, 1.

Typhus fever.—Cases: Atlanta, 2, Savannah, 3; Mobile, 1; Dallas, 1; Houston, 1.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended October 9, 1937.—During the 2 weeks ended October 9, 1937, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis			1	4	2					7
Chicken pox		9		50	101	60	17	7	83	327
Diphtheria		1	8	102	14	11	6	1		143
Dysentery				3	4		8			15
Erysipelas				7			1		3	11
Influenza		14		2	1				12	29
Measles		31	2	68	87	5	15	22	73	303
Mumps		2			527	5	3	1	15	553
Paratyphoid fever		1			2				2	5
Pneumonia		1			19				10	30
Poliomyelitis		5	47	14	283	34	63	27	4	477
Scarlet fever		9	4	196	120	42	57	31	16	475
Trachoma									1	1
Tuberculosis	7	9	5	108	74	27	38	2	34	304
Typhoid fever		3	15	134	25	3	20	1	4	205
Undulant fever				1	11	2	2	1		17
Whooping cough		13		236	111	55	35	7	34	491

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for October 29, 1937, pages 1547–1562. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued November 26, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

China.—Cholera has been reported in China as follows: Week ended October 16, 1937, Annam Nghiloc, 4 cases; Hong Kong, 13 cases; Kwangchow Wan, 23 cases; Macao, 6 cases; Shanghai, 359 cases. Week ended September 25, 1937, Kwantung Leased Territory, Manchuria, 3 cases.

French Indochina.—During the week ended October 16, 1937, cholera was reported in French Indochina as follows: Haiphong, 169 cases; Hanoi, 71 cases; Tonkin Province, 973 cases.

Plague

United States—California.—A report of plague in California appears on page 1594 of this issue of PUBLIC HEALTH REPORTS.

Yellow Fever

Senegal.—During the week ended October 16, 1937, yellow fever was reported in Senegal as follows: Diakhao, 1 case; Rufisque, 1 case; Thies, 2 cases.

UNITED STATES TREASURY DEPARTMENT

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THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

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It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

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PROTRACTED INCUBATION IN MALARIAL FEVER

Report of a Case and a Review of the Literature

By BRUCE MAYNE, *Special Expert, United States Public Health Service*

In an attempt to demonstrate the practicability of importing a suspended culture of mosquito sporozoites from England, in October 1935, one of the inoculated cases provided the first instance in America, as far as known, of experimental protracted incubation. The origin of the sporozoite suspension was the *Plasmodium vivax* (British Ministry of Health "Madagascar" strain) from *Anopheles maculipennis* var. *atroparvus*, prepared in collaboration with Mr. P. G. Shute, F. R. E. S., the Assistant Director of the Ministry of Health Malaria Laboratory at Horton, England, on October 14, 1935.

The culture medium prepared for this purpose was made up from defibrinated human blood and enriched with sodium dextrose to 1 percent, as is usual. The blood was taken from a malaria-free subject (the writer) the previous day and held at a temperature of 48° F. for 36 hours before planting.

The imported benign tertian malaria strain brought back from England was inoculated on October 23, 1935, into a patient at St. Elizabeths Hospital, Washington, D. C. The first malarial paroxysm followed 1 year later, on October 6, 1936, showing a severe attack accompanied by eight well-marked paroxysms with temperature elevation to 106° F. Blood films taken from this patient demonstrated a moderate number of typical amoeboid *vivax* rings and a scanty number of gametocytes from one-half to three-quarters grown.

The clinical history of this patient (case no. 20843) is as follows: An adult male, had not been out of St. Elizabeths Hospital, in Washington, D. C., for 23 years prior to inoculation, and was kept under continual observation during the incubation period.

The important question of recrudescence or reinfection may be definitely ruled out, and it is to be noted that no malaria case has ever occurred in the hospital reservation other than through artificial inoculation. After the sporozoite suspension had been administered, the patient was returned to his regular employment as a laundry worker and was observed closely for a period of 2 months for an occurrence of malarial symptoms. Nothing of note occurred. He had been given routine semiannual hospital temperature observations,

January 8 through January 14, 1936 and again 6 months later, July 8 through July 14. He worked daily in an apparently normal state of health until October 6, 1936, when he suffered his first malarial paroxysm, with an elevation of temperature to 103° F. Chills and fever recurred on the following dates without interruption:

	°F.
October 8	106
October 10	106
October 12	105.4
October 13	105
October 15	105.6
October 17	105.8
October 19	104

He began to show unusual weakness, and was troubled with severe emesis following October 10. This became so severe that it was necessary to terminate the malaria on October 19, and no chills have recurred since that date. Blood smears were taken finally on October 19, at which time the presence of uncomplicated tertian malaria was confirmed. After the fourth paroxysm, blood was used to inoculate a second patient, followed by a definite paroxysm with temperature elevation to 104.8° on the 13th day, and tertian schizonts were demonstrated on the following day.

On consulting the literature we find that Korteweg, a practicing physician in the malaria section of the Netherlands, as early as 1902 made observations from first hand which threw doubt on the general applicability of the pyrogenic limit accounting for the incubation in the usual successive generations in tertian malaria. He encountered numerous cases of malaria from March to May, when the anopheline prevalence was at a low peak and there was no evidence of infected mosquitoes among the hibernated (winter-surviving) forms. He concluded that these cases were due to infections acquired during the preceding autumn. This view was supported by Schoo and other prominent Dutch malariologists. The early work of Swellengrebel, in 1921, showed that malaria infection in anophelines in the same section was confined to autumn and winter and was almost absent during the height of the clinical malaria season. About this time, Korteweg produced new evidence showing that individuals living in houses where malaria occurred in early autumn ran a greater risk of contracting malaria before June 1 than other persons under normal conditions.

These observations were given further experimental support in 1926 by James and Shute, who, with natural insect transmission, encountered cases which failed to respond in autumn or winter, but showed first symptoms in the following June and July, as results of the attacks of mosquitoes. In a series of trials, James, in 1927, recorded the history of these experimental cases, of which one patient

was bitten by infected mosquitoes in November; two patients in December; and a fourth in February, all four developing typical malaria, but not before 6 to 9 months had passed.

Then followed the confirmatory experimental transmissions of the Dutch malariologists, Schüffner, Korteweg, and Swellengrebel, in 1928. These trials were first introduced by using heavy infections of anophelines which were given up to 45 opportunities to transmit the infection by biting. Infections resulted in the usual incubation period of from 2 weeks to 22 days. Varying these infection experiments with the application of one to two bites, using only one mosquito infour of the trials and two on two other occasions, malarial fever was produced at the end of a protracted incubation period, extending through the winter and spring, of from 7 months and 16 days to 9 months, the results coinciding with the work of James and Shute, who reported incubations of 7 to 9 months, using paretic patients under similar conditions. In these tests the six volunteers were Dutch scientists, living in Holland at the time of the experimental inoculations. They used meticulous foresight in observing their physical condition so as to guard against overlooking slight attacks or recurrences of any possible previous infection. During the 3 weeks following the infecting bites, temperatures were taken thrice daily and thick blood films were examined at frequent intervals, and they could conscientiously rule out the possibility that relapses had caused slight undetected attacks during the entire period of the 9 months while the subjects were under clinical surveillance. As a result of these demonstrated long incubation periods with experimental malaria, the Dutch experimenters concluded that the clinical manifestations observed as late as July may be accounted for by infections acquired during the preceding autumn.

James and Shute (1926) reported the first experimental evidence of long latency in malaria transmitted by mosquito bites in an attempt to account for the origin of their cases. They state that, although they are not prepared to prove that the apparent failures were due to an insufficiency of the infected dose, many examples of long latency of malaria in nature are recorded in the literature; but up to the present time the matter has not been proved by laboratory work. They make interesting notations before committing themselves in one set of experiments in which ten individual mosquitoes were used to infect patients prior to January. They suggest that, about the middle of the period, the infected insect hosts had discharged a large proportion of the sporozoites into the early patients bitten and that the persons bitten during the second half of the period may have received only a small dose of sporozoites, and it was during this interim that they record most of the failures in their malaria therapy tests from this same batch of mosquitoes.

On the subject of the infection in patients by the bites of mosquitoes, they note that an interesting result in relation to the malaria problem in nature is the failure of some of the patients, who were bitten during the winter, to develop malaria.

This was regarded as a surprise, because throughout the summer there had been no failures in their attempts to induce malaria with a similar batch of anophelines, using the identical strain of parasites. They state: "If any patient who has not yet developed malaria as a result of mosquito bites in November or December should develop an attack in the spring, we shall know that the infection has remained latent throughout the winter."

In 1931, James summarized the records of unusual incubation periods and latent infections. Among the 746 incubation periods in cases of primary tertian malaria caused by mosquito bites, several instances are recorded wherein 6 months or more lapsed after the patient had been bitten before the onset of a malarial attack. He states that these cases of infection should be correctly described as having remained latent. This condition of latency has often been described as occurring in natural circumstances, but opportunities for observing the experiments do not often arise in the routine practice of induced malaria therapy. Here, when it is reported that the infection has failed to take, reinoculation by mosquito bites or by blood must usually be repeated until it is effective. The English workers observed instances among patients who, for various reasons, were not subjected to reinfection when the primary infection was reported to have failed. They state: "It will be seen that the seasonal clinical incidence is about the same as that of natural benign tertian malaria in northern Europe and that the spring rise about which so much has been written, is due to recurrences in persons who had their primary attack in September; that in natural circumstances, the occurrence of these cases in the spring is not due to any special climatic or other environmental condition peculiar to that season."

Colonel James next considered the dose of infection. Infection by the bites of two or three lightly infected mosquitoes is usually quite different from the result of infection by the bites of many heavily infected insects. When only a small dose of sporozoites is injected, the result is an abortive primary fever which passes off in 2 or 3 days, or there is no primary attack at all, and the infection remains latent; but the difference is only one of degree, and the subsequent course of both types is the same; namely, there is a long period of complete freedom from fever and parasites. This observation is a repetition in the laboratory of what happens in countries like Holland, where (because only one or two lightly infected mosquitoes are responsible for each indigenous case) most of the cases are abortive or latent in the primary attack and are detected only at the period of recurrence

in the following spring. The recurrences, or late relapses, which appear 7 months after the primary attack of benign tertian, occur only in cases infected by the bites of mosquitoes; they are never seen in cases induced by the inoculation of malarial blood.

Christophers, in commenting on James' paper (1936), believes that experimental conditions cited in human malaria are duplicated in bird malaria in his own experiments in which a great number of birds bitten by single mosquitoes which afterwards proved to have moderate to few numbers of gland sporozoites either produced no "takes" or the infection developed by the 10th or 12th day instead of the normal 6th day. He concludes that it is probable that the minimal dosage had delayed the appearance of infection.

Martini (1931) cites two cases of malaria of prolonged incubation, one of which is frankly an experimental inoculation from mosquito biting and the other relates to the infection in his own person, reacting to attacks of mosquitoes in a highly malarious zone. This report is emphasized by Martini in the following, taken from his notes:

To begin with, the question of relapses or reinfection does not exist here as the observation can be vouched for, having been drawn from experiences in Hamburg, Germany. Therefore, the conclusions may be more accurate than if made in a country where malaria abounds. One, an experimental inoculation, and the other, equivalent to it, ran their natural courses, showing the picture of protracted latency. In case no. 1 the technical assistant in Martini's laboratory in Hamburg allowed an infected *Anopheles maculipennis* to bite her on June 1, 1927. She had never been exposed to malaria previously and remained continuously in the city of Hamburg during the entire period of the observation. The blood, on repeated examinations, remained negative during the observed period. On May 29, 1928, the experimental subject had a chill and fever, which was repeated on two other occasions before June 2, 1928. Microscopic examination showed numerous *vivax* parasites, fully 12 months following the experimental bite.

In his own case, Martini offers as evidence (however circumstantial) of protracted latency, attacks by mosquitoes in the Pontine Marshes in July 1930, which culminated in a chain of clinical manifestations in a subacute manner over a period of 10 months. Frequent blood examinations were made during the summer, fall, and winter, and not until May 1931 were tertian rings and gametocytes found in the blood. At that time typical malarial paroxysms occurred.

The only American reference found on the subject of experimental protracted incubation is that of Boyd, Kitchen, and Muench (1936). Here, 85 and 97 days are cited in two instances of experimental inoculations in malaria therapy as the period elapsing between inoculation and the first detection of parasites. The remaining references were based on epidemiological or circumstantial data. An example of this

may be taken from Deaderick (1916), who states that the latent stage of chronic malaria resembles in some respects a period of incubation. In fact, the cases reported with unduly long stages of incubation are doubtless nothing but latent stages of the chronic disease. During the latent stage, parasites may or may not be found in the peripheral blood.

Colonel Craig (1909) cites instances in his own experiences and those of his colleagues of the United States Army which indicate that an incubation period after natural infection is not generally accurately recorded and can be determined only in a very small proportion of cases. He states that instances do occur in which the incubation is greatly prolonged and quotes Sternberg in the instance of certain sailors who were infected while their ship lay in a malarious port. They developed the disease, one 48 days and the other 184 days, after leaving the port.

Another instance in his own experience reported on August 18, 1899, concerns a United States Army surgeon, who was exposed to malaria in Habana, Cuba, and demonstrated an incubation period of at least 7 months. Craig mentions two other instances, of United States Army officers stationed in the Philippines who, as a result of exposure, developed malaria 1 and 4 months, respectively, after returning to the United States.

Colonel Craig states that the cause of this variation may be sought in the number of sporozoites inoculated by the mosquito, the resistance of the individual inoculated, the character of the sporozoites as regards infectivity, and the natural conditions favoring the development of the plasmodia within the infected individual. He says: "Certain it is that in a large proportion of the cases presenting long periods of incubation, the theory first advocated by Thayer is true; namely, that while no symptoms are produced, the parasites multiply and perform their life cycle in small numbers."

DISCUSSION

It is stated by James and Shute (1936) that, with benign tertian infections, a protracted incubation can be effected by giving 0.6 g atebrin or 0.08 g plasmochin the day before and the day after mosquito application, irrespective of the number of bites. This, I presume, may be compared with attenuated virus or virulence of reduced potency.

Whether or not a self-aborted attack develops into latency of the protracted kind remains to be proved. The experience of the British Ministry of Health laboratory workers and that indicated by Martini in the account of his own infection suggest a parallel in a mosquito culture case recently observed at our field laboratory. In 16 days after the mosquito material had been injected, a clinical elevation of

temperature was manifested, which disappeared within 48 hours. Parasites could not be demonstrated. Are these latent cases in benign tertian due to small doses of sporozoites as suggested by Swellengrebel, Christophers, and James and Shute? If only one mosquito (lightly infected) bites a patient, the first attack is often 9 months delayed.

It is conjectural whether, in these artificial protracted periods of incubation, there follows the destruction of most, but not all of the injected parasites, and whether those which survive produce the latent attack.

It is stated by Christophers (1934) that Shute has demonstrated that an anopheline mosquito may still harbor sporozoites in its salivary glands after it has had at least 30 applications in biting a mammalian host. It is plausible, therefore, that in the fall of the year, or the prehibernation period, a mosquito carrier, though in a depleted condition, accounts for malaria transmission with a sequel of latency. This is generally not recognized.

It may be inferred from the experimental evidence advanced that the infection with malaria blood during autumn and winter, causing malarial symptoms after an incubation period of the usual length, might disprove the hypothesis of protracted incubation; but it has been shown by James and Shute that induced malaria through injection of blood cannot be compared with the natural insect transmission. It is regarded as possible that some of our recorded failures in insect biting might have resulted in protracted incubation if left uninterrupted; but on account of the attitude (quite proper) of the psychiatrist, who wishes his patients to respond to malaria therapy at the earliest occasion, the injection of malarious blood as a substitute is insisted upon. This procedure, of course, militates against ascertaining the subsequent history of the incubation period, which might contribute some light on the question of latency.

We might mention, in the realm of speculation, as another one of the principles involved in incubation periods of a protracted nature, the important matter of hibernation of infectivity during the colder months in southern endemic areas.

It is still unsettled as to the practicability of hibernation of malaria organisms in the mosquitoes' salivary glands. This is a point which has always remained unsettled since my own work in 1915 in the Mississippi Valley, although the work of King shows, at least theoretically, the possibility of survival of the sporozoite in the salivary glands of mosquitoes when exposed to short periods of cold.

The work of Boyd and Stratman-Thomas contributes a new light on the character of the motility of the sporozoite. It is not satisfactory evidence to claim viability for the organisms carried by the mosquito only by the demonstration of motility of these forms; one

must actually prove it through the inoculation of human subjects either through mosquito biting or with the dissected-out sporozoites.

Another point which is involved in our hypothetical discussion is the dosage of sporozoites. However, this, I am certain, will be predicated on the quality (potency) of the individual organisms. We shall, in the future, have to formulate a new interpretation of virulence and potency, as far as malaria insect carriage is concerned, besides the quality of motility and abundance of gland sporozoites as a measure of viability of malaria organisms.

Another consideration that may enter into the picture is that it has been the European and not the American strains in which the protracted incubation periods have been recorded. This suggests that either this phenomenon is a strain characteristic or such manifestations in American strains have been overlooked.

Certain it is that, as far as malaria therapy is concerned, a strain of malaria which offers incubation of this great length would not commend itself to the psychiatrist who is interested in the immediate benefits accruing from clinical malaria.

It is interesting to note regarding the strain of malaria used for making the suspensions for shipment from England, provided some years previously, that several instances of protracted incubation occurred in patients reacting to mosquito applications. To anticipate a logical query which may arise, transfer of blood from these cases did not occasion an unusual incubation period.

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Thiel, van: (1922) Anopheles en malaria in Leiden en naaste omgeving. Acad. Proefschr. S. C. v. Doesburgh, Leiden.
Boyd, Mark F., Kitchen, S. F., and Muench, Hugo: (1936) Seasonal variations in the characteristics of vivax malaria. Am. J. Trop. Med., v. 16, No. 5, pp. 589–592 (Sept. 1936).
Christophers, S. R., and Missiroli, A.: (1934) Report on housing and malaria. League of Nations Quarterly Bulletin, v. II, Extract No. 6 (1), p. 377.

OCCUPATIONAL AND ENVIRONMENTAL ANALYSIS OF THE CEMENT, CLAY, AND POTTERY INDUSTRIES [1]

Any program undertaken for preventing occupational diseases presupposes a knowledge of the problems which must be solved. Attention must be given to every occupation in order to uncover potential hazards. This requires an accurate knowledge of the occu-

[1] By R. R. Sayers, J. M. Dalla Valle, and S. G. Bloomfield. Public Health Bulletin No. 238, Govt. Printing Office, Wash., D. C., September 1937.

pational environment and the activities undertaken by each worker where hazards are found to exist. The lack of such basic and vital information has done much to retard the progress of industrial hygiene.

Public Health Bulletin No. 238, recently issued by the Public Health Service, is the outcome of industrial-hygiene surveys undertaken by the Occupational Morbidity and Mortality Study, part of the National Health Survey, and by industrial-hygiene divisions recently organized in several States by the Public Health Service. The purpose of these surveys was to determine in a large group of industries all occupations and their associated environmental exposures. In this way it was possible, following the method outlined by Bloomfield, Scott, and Sayers, and referred to in Public Health Bulletin No. 216 (1934), to uncover all potential health hazards.

The bulletin comprises an occupational and environmental analysis of the portland-cement industry, the clay industry (including brick, tile, and sewer-pipe departments), and the pottery industry. There is given a general outline of each industry, a flow sheet, and a tabular arrangement of all occupations. The latter lists the departments in which these occupations are to be found, the materials and exposure associated with each occupation, and a brief description of the operations involved. Finally, there is included a list of occupations by department.

The data presented in the bulletin are valuable to State departments of industrial hygiene, to casualty-insurance companies, and to other agencies which are interested in the environment of the worker and its effect upon health. The information is likewise useful in the event it is desired to make any extensive health studies of a given industry, since the bulletin presents in a comprehensive way all qualitative material which it is necessary to have available for such purposes.

The bulletin is designed to indicate the manner in which the material collected in the course of industrial-hygiene surveys may be analyzed. It is hoped that bulletins covering other industries may be issued from time to time.

STATE AND INSULAR HEALTH AUTHORITIES, 1937

DIRECTORY, WITH DATA AS TO APPROPRIATIONS AND PUBLICATIONS

Directories of the State and insular health authorities of the United States for each year from 1912 to 1936, except 1932, have been published in the PUBLIC HEALTH REPORTS and reprinted as separates [1] for the information of health officers and others interested in public health activities. The present directory (1937), like those previously issued, has been compiled from information furnished by the respective State and insular health officers, and includes data as to appropriations and publications.[2]

Where an officer has been reported to be a "whole-time" health officer, that fact is indicated by an asterisk (*). For this purpose a "whole-time" health officer is defined as "one who does not engage in the practice of medicine or in any other business but devotes all of his time to official duties."

ALABAMA DEPARTMENT OF PUBLIC HEALTH

Board of censors of the medical association of the State of Alabama, acting as a State committee of public health.
- Bibb Graves, governor, ex officio chairman, Montgomery.
- E. V. Caldwell, M. D., chairman, Huntsville.
- M. Y. Dabney, M. D., Birmingham.
- M. S. Davie, M. D., Dothan.
- S A Gordon, M. D., Marion
- Fred W. Wilkerson, M D., Montgomery.
- J. D. Perdue, M D., Mobile
- W. D. Partlow, M. D., Tuscaloosa.
- Lloyd Noland, M. D., Fairfield.
- K. A. Mayer, M. D., Lower Peach Tree.
- T. Brannon Hubbard, M. D., Montgomery.

Bureau of administration:
- Executive health officer:
  - *J. N. Baker, M. D., State health officer, Montgomery
  - *Bessie A. Tucker, secretary of State health officer, Montgomery.
  - *G. S. Savage, financial secretary, Montgomery.
- Division of county organization:
  - *Douglas L. Cannon, M. D., director, Montgomery.
  - *J. S. Hough, M. D., field adviser in county organization, Montgomery.
  - *A. M. Shelamer, M D., field adviser in county organization, Athens.
- Division of public health education:
  - *John M. Gibson, director, Montgomery.

Bureau of communicable disease control:
- *D. G. Gill, M. D., D. P. H., director, Montgomery.
- Division of venereal disease control:
  - *W. H. Y. Smith, M. D., C. P. H., director, Montgomery.

Bureau of communicable disease control—Contd.
- Division of industrial hygiene
  - *Wm. F Queen, M D., director, Montgomery.
- Division of tuberculosis control:
  - *Holland Thompson, M. D., clinician, Montgomery
  - *K N. Joseph, M. D , clinician, Decatur.
  - *Mary S. Pugh, R. N , X-ray technician, Montgomery.
  - *Mrs Foster Teague, R. N., X-ray technician, Montgomery.

Bureau of hygiene and nursing.
- *B. F. Austin, M. D., director, Montgomery.
- Division of child hygiene.
  - *J J. Repa, M. D., pediatrician, Montgomery.
  - *Reuben T Crawford, D D S., Montgomery.
  - *Gladys Prestwood, R. N , Montgomery.
  - *Sarah Brooks Jones, R. N., Montgomery.
  - *Velma Owens, R N., Montgomery
  - *Margaret Murphy, R. N., Montgomery.

Bureau of laboratories:
- *James G. McAlpine, Ph. D., general director, Montgomery
- Anniston branch:
  - *Mary Walker, Anniston.
- Birmingham branch.
  - *George A Denison, M. D , Birmingham.
- Dothan branch·
  - *Nellie K. Whitfield, Dothan.
- Huntsville branch
  - *Mrs Buford Gatlin, Huntsville.
- Mobile branch·
  - *C H. Waite, Mobile.
- Selma branch:
  - *Mrs. L. G. Johnson, Selma.
- Tennessee Valley branch:
  - *C C Johnson, Decatur.
- Tuscaloosa branch:
  - *Cannie Campbell, Tuscaloosa.

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[1] Reprints nos. 83, 123, 190, 268, 344, 405, 488, 544, 605, 706, 775, 871, 949, 1043, 1106, 1188, 1254, 1334, 1425, 1522, 1604, 1675, 1724, and 1779, from the PUBLIC HEALTH REPORTS.

[2] While the information presented in this directory has been furnished recently by the State and insular health authorities, it does not include, for some of the States, new administrative divisions or bureaus that have been established as a result of grants in aid under the Social Security Act, such as divisions of industrial hygiene, maternal and child welfare, and special divisions under communicable disease control (venereal diseases, malaria, tuberculosis).

Any errors discovered in this directory should be reported to the Surgeon General, U. S. Public Health Service, Washington, D. C.

Bureau of sanitation:
*G. H. Hazlehurst, M. C. E., director, Montgomery.
Assistant engineers:
*T. H. Milford, B. S. in C. E., M. S. in San. E., Montgomery.
*A. N. Beck, B. S. in C. E., M. S. in San. E., Montgomery.
*R. V. Barnes, B. S. in C. E., M. S. in San. E., Montgomery.
*J. C. Clarke, B. S. in C. E., Montgomery.
*Frank B. Wood, B. S. in C. E., Montgomery.
*O. G. Quenelle, M. S. in M. E., Tuscumbia.
*C. W. White, B. S. in Min. E., Montgomery.
*G. S. Christopher, B. S. in M. E., Montgomery.
Division of inspection:
*C. A. Abele, Ch. E., director, Montgomery.
*H. J. Thrasher, Huntsville.
*F. H. Downs, B. S. in D. H., Montgomery.
Bureau of vital statistics:
*Leonard V. Phelps, S. B. in P. H., Montgomery.
Appropriation for fiscal year ending September 30, 1937:
Annual appropriation for all health work, including county organization, and exclusive of State subsidy to counties for maintenance of tuberculosis sanatoria, $430,000. (Subject to proration on basis of available revenue coming into the general fund.)

ALASKA DEPARTMENT OF HEALTH

Executive health officer:
Walter W. Council, M. D., commissioner of health, Juneau.
Assistant commissioners of health:
A. D. Haverstock, M. D., Seward.
Thomas Morcom, M. D., Nome.
Floyd B. Gillespie, M. D., Fairbanks.
Appropriation for 1937-39, $34,350.

ARIZONA STATE BOARD OF HEALTH

State board of health:
R. C. Stanford, Governor, president, Phoenix.
Joe Conway, vice president, Phoenix.
Coit I. Hughes, M. D., secretary, Phoenix.
Administrative office:
Coit I. Hughes, M. D., State superintendent of public health, State registrar of vital statistics.
*Alfred R. Cheever, Jr., secretary.
*W. E. Harrell, auditor.
*Fred C. Ruppelius, statistician.
State laboratory:
*Robert A. Green, director, Tucson.
*Marion Stroud, bacteriologist, Phoenix.
Division of sanitary engineering:
*F. C. Roberts, Jr.
Division of maternal and child health:
*Jack B. Eason, M. D.
Division of local health administration:
*J. D. Dunshee, M. D.
County health units:
*R. B. Durfee, M. D., director, Cochise County.
*G. F. Manning, M. D., director, Coconino County.
*L. H. Howard, M. D., director, Pima County.
Appropriations, year ending June 30, 1938:

Board of health	$17,824
Child hygiene	20,050
State laboratory	11,020

ARKANSAS STATE BOARD OF HEALTH

Board of health:
F. O. Mahoney, M. D., president, El Dorado.
W. H. Hodges, M. D., Malvern.
Thomas Wilson, M. D., Wynne.
J. G. Gladden, M. D., Harrison.
E. D. McKnight, M. D., Brinkley.
L. D. Duncan, M. D., Waldron.
M. E. McCaskill, M. D., Little Rock.
Executive health officer:
***Wm. B. Grayson, M. D.**, State health officer, Little Rock.
Bureau of vital statistics:
*Mrs. J. B. Collie, statistician, Little Rock.
*J. C. Smalley, field agent, Little Rock.
*Edwin H. Boysen, field agent, Little Rock.
Hygienic laboratory:
*H. V. Stewart, associate director, Little Rock.
*Mildred M. Moss, bacteriologist, Little Rock.
*Mildred S. Fatherree, M. D., bacteriologist, Little Rock.
*R. E. Byrd, water chemist, Little Rock.
——— ———, serologist.
Bureau of sanitary engineering:
*F. L. McDonald, E. E., chief sanitary engineer, Little Rock.
*Walter A. Reinman, C. E., assistant engineer, Little Rock.
*James P. Slater, director, division of community sanitation.
*D. Webster Jones, B. S. A., director of milk control, Little Rock.
Bureau of local health service:
*T. T. Ross, M. D., M. P. H., assistant State health officer, director, Little Rock.
*W. Myers Smith, M. D., M. P. H., director, division of maternal and child health, Little Rock.
*Margaret S. Vaughan, R. N., supervisor of public health nursing, Little Rock.
*Mattie Neely, R. N., chief consultant nurse, division of maternal and child health, Little Rock.
*A. M. Washburn, M. D., M. P. H., director of communicable disease control, Little Rock.
*D. W. Fulmer, M. D., M. P. H., director, subdivision of malaria control, Little Rock.
*S. L. Davies, C. E., sanitary engineer, subdivision of malaria control, Little Rock.
——— ———, entomologist, subdivision of malaria control.
——— ———, director, subdivision of tuberculosis control.
*Gale Morris, accountant.
Training center, Morrilton:
*W. P. Scarlett, M. D., M. P. H., director.
*John M. Smith, M. D., assistant director.
Appropriation for biennial period ending June 30, 1939:

Executive salary and miscellaneous	$19,800
Bureau of vital statistics	34,200
Registrars' fees	31,000
	65,200
Bureau of sanitary engineering	18,600
Hygienic laboratory	19,940
Bureau of local health service	360,000

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH

Board of public health:
Howard Morrow, M. D., president, San Francisco.
Edward M. Pallette, M. D., vice president, Los Angeles.
Walter M. Dickie, M. D., director of public health, Sacramento.
Roy A. Terry, M. D., Long Beach.
William R. P. Clark, M. D., San Francisco.
George H. Kress, M. D., Los Angeles.
Gustave Wilson, M. D., Sacramento.
Department of public health:
***Walter M. Dickie, M. D.**, director of public health, Sacramento.
Bureau of epidemiology:
*Harlin L. Wynns, M. D., chief, San Francisco.
*Ida May Stevens, supervising morbidity statistician.
*Gavin J. Telfer, M. D., epidemiologist, Los Angeles.
Bureau of sanitary inspections:
*Edward T. Ross, chief, Sacramento.
Bureau of vital statistics:
*Marie B. Stringer, chief, Sacramento.
Bureau of registration nurses:
*Helen F. Hansen, chief, Sacramento.
Bureau of tuberculosis:
*Edyth L. M. Tate-Thompson, chief, Sacramento.
Bureau of venereal diseases:
*Malcolm H. Merrill, M. D., chief, Sacramento.
Bureau of industrial hygiene:
*John P. Russel, M. D., C. P. H., chief, Sacramento.

Bureau of county health work:
*George M. Uhl, M. D., C. P. H., chief, Sacramento.
Bureau of food and drug inspections:
*M. P. Duffy, chief.
Division of laboratories:
*W. H. Kellogg, M. D., chief, Berkeley.
Bureau of sanitary engineering:
*C. G. Gillespie, C. E., chief, Berkeley.
Bureau of child hygiene:
*Ellen S. Stadtmuller, M. D., chief, San Francisco.
Bureau of cannery inspections:
M. P. Duffy, chief
Appropriations available July 1, 1937, for biennial period ending June 30, 1939 (89th and 90th years):

Administration:	
For support, department of public health	$427,300
Bureau of cannery inspection.	
For support (payable from cannery-inspection funds)	336,320
Bureau of registration of nurses:	
For support (payable from nurses registration funds)	49,020
Bureau of food and drug inspections:	
Alcohol beverage control fund	60,000
Tuberculosis bureau	
Allotment for support, included in item "For support, department of public health", $20,230.	
For subsidies	1,400,000
Total	2,272,640

Other sources of revenue:
Fees for registration of nurses, $10 each. (Fees for California graduate nurses, $5 only.)
Renewal of registration certificates, $1 each per year
Licensing of cold-storage warehouses, rated according to capacity, for credit to general fund.
Fines for violation of pure food and drugs acts, for credit to general fund.
Fees for licenses, $50 each, and contributions, for credit to bureau of cannery inspection.
Fees for searches and certified copies of records, for credit to general fund.
Fees for inspection and registration of aviaries, $5 each.
Fees for inspection of clinics and dispensaries, $20 each.
Publications issued by health department:
Biennial report.
Weekly bulletin.
Special bulletins.
General health laws.

COLORADO STATE DIVISION OF PUBLIC HEALTH

State board of health:
Paul J. Connor, M. D., president, Denver.
William P. Gasser, M. D., vice president, Loveland.
R. L. Cleere, M. D., C. P. H., secretary and executive officer, Denver.
G. W. Bumpus, D. O., Denver.
N. M. Burnett, M. D., Lamar.
Ben Beshoar, M. D., Trinidad.
C. A. Davlin, M. D., Alamosa.
Frank Onufrock, Colorado Springs.
H. C. Dolph, D. D. S., Denver.
Division of administration:
*R. L. Cleere, M. D., C. P. H., secretary and executive officer, Denver.
Division of rural health work and epidemiology:
*James S. Cullyford, M. D., C. P. H., director.
Division of social hygiene:
*R. L. Cleere, M. D., C. P. H., secretary and executive officer, Denver.
Division of plumbing:
*Irving A. Fuller, chief inspector.
Division of bacteriology:
*W. C. Mitchell, M. D., bacteriologist.
Division of sanitary engineering:
*Benjamin V. Howe, sanitary engineer.
Division of vital statistics:
*Frank S. Morrison, LL. B., director.
Division of food and drugs:
*Walter W. Lear, commissioner.
Division of crippled children:
*Vera H. Jones, M. D., director.
Division of maternal and child health:
*Vera H. Jones, M. D., director
Division of public health nursing:
*Ruth E. Phillips, R. N., supervisor.
Appropriations for fiscal years ending June 30, 1938 and 1939:

	1938	1939
Salaries	$71,367	$71,547
Laboratory equipment and supplies	1,000	1,000
Printing	2,850	2,850
Traveling expenses	16,013	16,013
Venereal disease	5,500	5,500
Incidental	4,065	4,065
Physicians' and surgeons' fees and hospitalization	31,205	31,205
Total	132,000	132,180

CONNECTICUT DEPARTMENT OF HEALTH

Public health council:
C. E A. Winslow, D. P. H.
James W. Knox.
James A. Newlands.
David R Lyman, M. D.
Robert A Cairns, C E.
Joseph M Ganey, M. D.
Executive health officer:
*Stanley H. Osborn, M. D., C. P. H., commissioner of health, Hartford.
Bureau of preventable diseases.
*Millard Knowlton, M D , C P. H , director.
Bureau of vital statistics.
*William C. Welling, director.
Bureau of public-health nursing
———— ——— ——, director.
Bureau of child hygiene:
*Martha L Clifford, M. D , director.
Bureau of public-health instruction:
*Elizabeth C. Nickerson, C P H.
Bureau of laboratories:
*F Lee Mickle, director.
Bureau of sanitary engineering.
*Warren J Scott, director
Bureau of occupational diseases:
*Albert S Gray, M D , director.
Bureau of venereal diseases:
*Henry P. Talbot, M. D., M P. H., director.
Bureau of mental hygiene:
*James M. Cunningham, M. D., director.
Division of mouth hygiene:
*Franklin M Erlenbach, D. M. D., chief.
Division of medical registration:
*Ruth H. Monroe, chief.
Division of supplies:
*Lawrence A. Fagan, chief.
Division of local health administration:
*Franklin M. Foote, M D , chief.
Appropriation for fiscal period ending June 30, 1939 (2 years), $717,269.
Publications issued by health department:
Weekly bulletin.
Monthly bulletin
Annual vital-statistics report.
Annual report of State department of health.
Miscellaneous pamphlets.

DELAWARE STATE BOARD OF HEALTH

State board of health:
Stanley Worden, M. D., president, Dover.
Mrs. F. G. Tallman, vice president, Wilmington.
Mrs Arthur Brewington, secretary, Delmar.
R. E Ellegood, M. D., Wilmington
Mrs. Charles Warner, Wilmington.
John F. Maguire, D. D. S., Wilmington.
Bruce Barnes, M. D., Seaford.
M. I. Handy, M. D., Wilmington.
Executive health officer:
*Arthur C. Jost, M. D., C. M., Dover.

Director of laboratory:
*R. D. Herdman, Dover.
Director of communicable disease control:
*J. R. Beck, M. D., Dover.
Director of maternal and child health:
*Woodbridge E. Morris, M. D., Dover.
Sanitary engineer:
*R. C. Beckett, Dover.
Superintendent of Brandywine Sanatorium:
*L. D. Phillips, M. D., Marshallton.
Superintendent of Edgewood Sanatorium:
*Elizabeth Van Vranken, R. N., Marshallton.
State supervisor of nurses:
*Mrs. Kathryn Trent, R. N., Dover.
State oral hygienist:
*Miss Margaret Jeffreys, R. D. H., Dover.
County unit officers:
*J. R. Downes, M. D., New Castle County.
*E. F. Smith, M. D., Kent County.
*F. I. Hudson, M. D., Sussex County.
Appropriations for the fiscal year ending June 30, 1937:

General administration	$87,300
Hygiene laboratory	10,850
Edgewood Sanatorium for colored tuberculous patients	35,000
Brandywine Sanatorium for white tuberculous patients	167,000
Dental hygiene	12,000
Total	312,150
Special construction at Brandywine Sanatorium	25,000

Publications:
Annual report.
Bulletins on health subjects.
Weekly circular.

DISTRICT OF COLUMBIA HEALTH DEPARTMENT

Executive health officer:
***George C. Ruhland, M. D.**, health officer, Washington.
Assistant health officer:
Daniel L Sockinger, M. D., Washington.
Chief clerk and deputy health officer:
*Arthur G. Cole, Washington.
Chief, Bureau of Preventable Diseases, and director, bacteriological laboratory:
*James G. Cumming, M. D., Washington.
Bacteriologist:
*John E. Noble, Washington.
Serologist:
*Jesse P. Porch, D. V. M., Washington.
Maternity welfare:
J. Bay Jacobs, M. D., medical director.
Bureau of Nursing:
Mrs. Josephine Pittman Prescott, director.
Bureau of tuberculosis:
*A. Barklie Coulter, M. D., director.
Chemist:
*John B. Reed, Washington.
Chief sanitary inspector:
*J. Frank Butts, Washington.
Director child-hygiene service:
*Hugh J. Davis, M. D., Washington.
Chief food inspector:
*Reid R. Ashworth, D. V. S., Washington.
Chief medical and sanitary inspector of schools:
*Joseph A. Murphy, M. D., Washington.
Chief, bureau of vital statistics:
*Joseph B. Irvine, Washington.
Director, bureau of maternal and child hygiene:
*Ella Oppenheimer, M. D.
Director, public health instruction:
*Melvin P. Isaminger, M. D.
Appropriations for the fiscal year ending June 30, 1938:

Salaries	$217,690
Prevention of communicable diseases	43,830
Milk and food inspection and regulation	7,000
Dispensary service, including treatment of tuberculosis and venereal diseases	45,380
Maintaining a child hygiene service	25,000
Hygiene and sanitation, public schools	111,060
Laboratory service	7,890
Nursing service	143,440
Tuberculosis sanitaria	494,963

Appropriations for the fiscal year ending June 30, 1938—Continued.

Gallinger Hospital	$878,480
Medical charities	155,000
Health Center	165,000
Miscellaneous	1,800
Total	2,096,533

Publications issued by health department:
Weekly report by health department.
Annual report of health officer.
Monthly statement of average grade of milk and ice cream sold.

FLORIDA STATE BOARD OF HEALTH

Board of health:
N. A. Baltzell, M. D., president, Marianna.
A. Wm. Morrison, Pharmacist.
Shaler Richardson, M. D., Jacksonville.
Executive health officer:
***W. A. McPhaul, M. D.**, State health officer, Jacksonville.
Diagnostic laboratories:
*Paul Eaton, M. D., D. P. H., director, Jacksonville.
Bureau of vital statistics:
*Edward M. L'Engle, M. D., director.
Bureau of sanitation:
*Fred A. Safay, director.
Division of public health nursing:
*Ruth E. Mettinger, R. N., director.
Division of drug inspection:
M. H. Doss, chief inspector, Jacksonville.
Bureau of maternal and child health:
R. N. Joyner, M. D., director.
Bureau of county health work:
A. B. McCreary, M. D., director.
Bureau of epidemiology:
Dan N. Cone, M. D., director.
Appropriation for health department:
One-half mill tax levied upon the assessable property of the State for the year ending June 30, 1936, and the same for the year ending June 30, 1937, but expenditures thereunder limited to $225,000 for each fiscal year.
Publications issued by health department:
Pamphlets covering all phases of public health.
Public health information disseminated through the weekly and daily papers of the State.
Florida health notes.
Annual reports.

GEORGIA DEPARTMENT OF PUBLIC HEALTH

State Board of Health:
Cleveland Thompson, M. D., Millen, First District.
C. K. Sharp, M. D., Arlington, Second District.
R. C. Ellis, Americus, Third District.
M. M. Head, M. D., Zebulon, Fourth District.
R. F. Maddox, Atlanta, Fifth District.
A. R. Rozar, M. D., Macon, Sixth District.
M. M. McCord, M. D., Rome, Seventh District.
H. W. Clements, M. D., Adel, Eighth District.
L. C. Allen, M. D., Hoschton, Ninth District.
W. A. Mulherin, M. D., Augusta, Tenth District.
T. C. Marshall, Ph. G., State at large, Atlanta.
W. T. Edmonds, State at large, Augusta.
J. G. Williams, D. D. S., State at large, Atlanta.
Paul McGee, D. D. S., State at large, Waycross.
Executive health officer:
***T. F. Abercrombie, M. D.**, director, Atlanta.
*J. P. Bowdoin, M. D., assistant director.
Division of venereal-disease control:
*Joe P. Bowdoin, M. D., chief, Atlanta.
Division of county health work:
*Guy G. Lunsford, M. D., chief, Atlanta.
Division of laboratories:
*T. F. Sellers, M. D., chief, Atlanta.
Division of sanitary engineering:
*L. M. Clarkson, chief, Atlanta.
Division of tuberculosis control:
*H. C. Schenck, M. D., chief, Atlanta.
Bureau of vital statistics:
*Butler Toombs, chief, Atlanta.
Division of child hygiene:
*Joe P. Bowdoin, M. D., chief, Atlanta.

Division of epidemiology:
*C. D. Bowdoin, M. D., chief.
Division of accounting and purchasing:
*C. L. Tinsley, chief, Atlanta.
Appropriations for the fiscal years ending June 30, 1938, and June 30, 1939:

General appropriation	$500,000

Scaled proportionately to State income.

TERRITORY OF HAWAII BOARD OF HEALTH

Board of health:
Clarence A. MacGregor, president, Honolulu.
S. B. Kemp, attorney general, Honolulu.
Guy C. Milnor, M. D., Honolulu.
Donald S. Bowman, Honolulu.
Edwin Lewis, Honolulu
Robert M. Yates, Honolulu.
W. H. Wynn, M. D, Honolulu
F. E. Trotter, M. D., Territorial commissioner of public health, Honolulu.
Executive health officer:
*F. E. Trotter, M. D., Territorial commissioner of Ppublic health, Honolulu.
Secretary.
*Florence S. Orr, Honolulu.
Health officer, island of Hawaii:
*Joseph S Caceres, Hilo.
Health officer, island of Kauai:
A. M Ecklund, M. D, Koloa.
Health officer, island of Maui.
*Laurence M. Wiig, M. D., Wailuku.
Tuberculosis bureau
*C. Alvin Dougan, M. D, director, Honolulu.
Bureau of public health nursing
*Mary Williams, director, Honolulu.
Bureau of communicable diseases·
*James R Enright, M D, director, Honolulu
Bacteriologist, island of Oahu:
*Alison W. Street, Honolulu.
Bacteriologist (acting), island of Hawaii:
*Miss Inoyo Kojima, Hilo
Bacteriologist, island of Maui·
Haliburton McCoy, M D, Puunene.
Bacteriologist, island of Kauai:
A. M Ecklund, M. D., Koloa.
Bacteriologist, island of Molokai:
Stanley Sakai, Kaunakakai.
Bureau of maternal and infant hygiene:
Frederick K Lam, M. D., director, Honolulu.
Bureau of sanitation
*S. W. Tay, director, Honolulu
*Fred Schultz, division supervisor, Honolulu.
*Clifford H. Bowman, division supervisor, island of Hawaii, Hilo
*R. C Lane, division supervisor, island of Maui, Wailuku.
*A. P. Christian, division supervisor, island of Kauai, Lihue.
*Robert B. Pauole, sanitary inspector, Leeward Molokai, Kaunakakai.
Bureau of vital statistics:
*Miss M. H. Lemon, registrar general, Honolulu
Bureau of pure food and drugs:
*M. B. Bairos, director, Honolulu.
Territorial hospital·
*A. B. Kroll, superintendent, Kaneohe, Oahu.
*R. D. Kepner, M. D., acting medical director, Kaneohe, Oahu.

Appropriations, biennium 1937-39:

Board of health—general administration:	
Personal services	$58,518
Other current expenses	7,500
Equipment	3,750
	69,768
Bureau of vital statistics:	
Personal services	25,018
Other current expenses	7,500
Equipment	750
	33,268
Tuberculosis bureau:	
Personal services	23,089
Other current expenses	10,000
Equipment	300
	33,389

Appropriations, biennium 1937-39—Con.
Tuberculosis—private hospitals:
Appropriation made by 1937 legislature direct to institutions Funds no longer under control of board of health.

Bureau of public health nursing.	
Personal services	$206,777
Other current expenses	35,500
Equipment	10,450
	252,727
Plague campaign:	
Personal services	74,610
Other current expenses	31,000
Equipment	8,091
Structures and permanent improvements to land	9,000
	122,701
Bureau of communicable diseases:	
Personal services	39,185
Other current expenses	24,000
Equipment	2,532
	65,717
Bureau of maternal and infant hygiene:	
Personal services	11,600
Other current expenses	22,550
Equipment	150
	34,300
Bureau of pure food and drugs:	
Personal services	18,534
Other current expenses	2,100
Equipment	1,000
	21,634
Board of examiners:	
Personal services	240
Other current expenses	300
	540
Bureau of sanitation:	
Personal services	139,727
Other current expenses	18,838
Equipment	11,800
	170,365
Government physicians:	
Personal services	86,403
Other current expenses	7,500
	93,903
Territorial hospital (insane):	
Personal services	498,805
Other current expenses	270,960
Equipment	24,895
Structures and permanent improvements to land	1,300
	795,960
Total	1,694,272

IDAHO DEPARTMENT OF PUBLIC WELFARE

DIVISION OF PUBLIC HEALTH

Executive health officer:
***James W. Hawkins, M. D.,** director of public health.
Division of local health administration:
***L. C. Kretcher, M. D., director.**
***Kathryn McCabe, R. N., P. H. N, supervising nurse.**
Division of maternal and child health and crippled children:
***H. L. McMartin, M. D., director.**
***Gladys Bell, assistant director.**

Division of sanitary engineering and chemistry:
*W. V. Leonard, M. E., director.
*James M. Welsh, sanitary inspector.
*C. H. Watson, sanitary inspector.
Division of bacteriological and hygienic laboratories
*L. J. Peterson, director.
*A. W. Klotz, assistant director.
*Edward G. Hoffman, laboratory technician.
*Paul C. Ward, C. E., field technician.
Division of vital statistics:
*Pearl Dillingham, registrar.
Appropriation for biennial period ending December 31, 1938:

Salaries of regular officers and employees	$41,328
Wages to extra help	400
Expert and special	1,200
	42,928
Services other than personal	18,000
Supplies	5,780
Equipment	800
Rents, fixed charges	3,424
	28,004
Total for salaries and wages and all other expenses	70,932
Special appropriation—industrial hygiene	5,000

Appropriation for hospitalization of tuberculosi patients:

Fixed charges	$51,400
Personal services	3,600
	55,000
Special grant from other sources of revenue in the State for crippled children (special grant for fiscal year ending June 30, 1938)	24,000

Other sources of revenue:
Aid through Social Security for public health work, maternal and child health, and crippled children.

ILLINOIS DEPARTMENT OF PUBLIC HEALTH

Board of public health advisors:
Clifford U. Collins, M. D., chairman.
E. J. Doering, M. D
Samuel E Munson, M. D.
Maurice Rubel, M. D.
Executive health officer:
*A. C. Baxter, M. D., acting director of public health, Springfield.
Assistant director of public health:
*A. C. Baxter, M. D.
Division of sanitary engineering:
*Clarence W. Klassen, C. E., chief sanitary engineer.
Division of communicable diseases:
*J. J. McShane, M. D., D. P. H., chief.
Division of child hygiene and public-health nursing:
*Grace S. Wightman, M D., chief.
Division of tuberculosis:
*A. C. Baxter, M. D., acting chief.
Division of laboratories:
*Howard J. Shaughnessy, Ph. D., chief.
Division of vital statistics:
*R. E. Woodruff, M. D., acting registrar.
Division of public-health instruction:
*Baxter K. Richardson, chief.
Division of hotel and lodging-house inspection:
——— ———, superintendent.
Appropriations for biennial period ending June 30, 1939:

	(Approximate)
Salaries	$858,840
Salaries State officers	27,800
Office expenses	26,202
Traveling expenses	149,600
Operation	440,000
Repairs and equipment	40,032
Contingent	65,000
Printing	60,000

Appropriations for biennial period ending June 30, 1939—Continued.

	(Approximate)
Postage	$28,000
Sanitary water-board law	30,000
Emergency	25,000
Slum area	40,000
Marriage laws	50,000
Total	1,840,474

Publications issued by health department:
Illinois Health Messenger (byweekly).
Weekly statistical bulletin for health officers.
Quarterlies on sanitation of water, milk, swimming pools, sewage disposal.
Newspaper releases and manuscript of radio broadcasts.
Educational health circulars.

INDIANA DEPARTMENT OF COMMERCE AND INDUSTRIES, STATE BOARD OF HEALTH

Board of health:
J C. Glackman, M. D., president, Rockport.
Edmund Van Buskirk, M. D., Fort Wayne.
Ernest Rupel, M. D., Indianapolis.
William Wise, M. D., Indianapolis.
Verne K. Harvey, M. D., secretary, Indianapolis.
Executive health officer:
*Verne K. Harvey, M. D., C. P. H. director, Indianapolis.
Assistant director:
*W. H. Frazier, Indianapolis.
Bureau of physical and health education:
Thurman B Rice, M. D., chief, Indianapolis.
Bureau of maternal and child health:
Howard B Mettel, M D., chief, Indianapolis.
Bacteriological laboratories:
Clyde G Culbertson, M. D., chief, Indianapolis.
Bureau of local health administration:
*John W Ferree, M. D., chief, Indianapolis.
Epidemiologist:
*J. W. Jackson, M. D., Indianapolis.
Bureau of public health nursing:
*Eva F. MacDougall, R. N., chief, Indianapolis.
Bureau of food and drugs:
*Harold V. Darnell, Ph. C , chief, Indianapolis.
Bureau of sanitary engineering:
*B. A. Poole, chief engineer, Indianapolis.
Bureau of weights and measures.
*Rollin E. Meek, chief, Indianapolis.
Bureau of dairy products:
*John Taylor, chief, Indianapolis.
Bureau of vital statistics:
*H M. Wright, chief, Indianapolis.
State investigator:
*Leo J. Rail, Indianapolis.
Auditor:
*D. S. McCready, Indianapolis.
Appropriation for fiscal year beginning July 1, 1937, and ending June 30, 1938, $238,500.

IOWA STATE DEPARTMENT OF HEALTH

EX OFFICIO

Nelson G. Kraschel, governor, Des Moines.
Robert E. O'Brian, secretary of State, Des Moines.
Leo J. Wegman, treasurer of State, Des Moines.
Thomas Curran, secretary of agriculture, Des Moines.
Walter L. Bierring, M. D., State commissioner of health, Des Moines.

APPOINTIVE BY GOVERNOR

Edward M. Myers, M. D., chairman, Boone.
Herbert E. Story, M. D., secretary, Osceola.
W. J. Connell, Hawkeye.
Walter A. Sternberg, M. D., Mt. Pleasant.
Charles E. Irwin, M. D., Marshalltown.
Executive health officer:
*Walter L. Bierring M. D. commissioner of health, Des Moines.
*M. F. Haygood, M. D., director of local health services, Des Moines.

Division of communicable diseases and epidemiology:
*Carl F. Jordan, M. D., C. P. H., director, Des Moines.
Division of child health and health education:
*J. H. Kinnaman, M. D., director, Des Moines.
Division of public health enginnering:
*A. H. Wieters, director, Des Moines.
State hygienic laboratories:
*M E. Barnes, M. D., director, Iowa City.
Division of public health nursing:
*Edith S. Countryman, R. N., director, Des Moines.
Division of vital statistics:
——————.
Division of licensure and registration:
*H. W. Grefe, director, Des Moines.
Division of law enforcement:
*Herman B. Carlson, director, Des Moines.
Division of barber inspection:
*William B. Wilson, director, Des Moines.
Division of cosmetology inspection:
*Helen Blake, executive secretary, Des Moines.
Housing work is carried on by engineering division.
Medical, dental, optometry, cosmetology, chiropractic, osteopathy, embalming, podiatry, and barber examining boards are combined in the State Department of Health.
Executive secretary:
Albert F. Vogt, Des Moines
Appropriations for fiscal year ending June 30, 1938:

Central administration	$24,570
Public health nursing division	4,950
Child health and health education	6,300
Preventable diseases (general)	5,820
Preventable diseases (venereal disease control)	40,000
Vital statistics	7,600
Public health engineering	18,800
Licensure and registration	7,540
	115,580
Examining boards:	
Medical, dental, osteopathic, chiropractic, embalmers, optometry, cosmetology, and barbers	38,760
	154,340

KANSAS STATE BOARD OF HEALTH

Board of health:
George I. Thacher, M. D., president, Waterville.
H L Aldrich, M. D., Caney.
W. C. Lathrop, M. D., Norton.
A. B Mitchell, LL B., Lawrence.
A. J. Rettenmaier, M D , Kansas City.
W. J. Eilerts, M. D., Wichita.
J. L. Lattimore, M. D , Topeka.
Alfred O'Donnell, M. D., Ellsworth.
Jos. W Spearing, M. D., Cimarron.
R T. Nichols, M. D., Hiawatha.
Executive health officer:
*F. P. Helm M. D., secretary and executive health officer, Topeka.
Division of vital statistics:
*Minnie Fleming, acting state registrar, Topeka.
Division of preventable diseases:
E. K. Musson, M. D.
*C. H. Kinnaman, M. D., epidemiologist, Topeka.
*R. H. Riedel, M. D., venereal diseases, Topeka.
*Clifton F. Hall, M. D., tuberculosis, Topeka.
Division of food and drugs:
*Thos. I. Dalton, Ph. C., assistant chief food and drug inspector, Topeka.
Division of child hygiene:
*H. R. Ross, M. D., director, Topeka.
R. F. Boyd. M. D., assistant director.
Division of sanitation:
Earnest Boyce, chief engineer, Lawrence.
Division of public health education:
*F. P. Helm, M. D., director, Topeka.
*Bertha H. Campbell, assistant director.
Water and sewage laboratories at Kansas University:
Earnest Boyce, director.
Food laboratory at Kansas University:
H. P. Cady, director.

Drug laboratory at Kansas University:
L D. Havenhill, director of drug analysis, Lawrence
Food laboratory at Kansas Agricultural College:
H. H. King, director of food analysis, Manhattan.
Public health laboratory, Topeka:
*Chas. A. Hunter, Ph. D., director, Topeka.

Appropriations for year ending June 30, 1938:

Executive	$5,020
Division of communicable diseases	13,304
Division of food and drugs	11,700
Division of child hygiene	8,470
Division of research and investigation work	6,000
Public health laboratory	10,000
Division of sanitation	3,000
Board members	1,000
Total	58,494

Other sources of revenue:
Marriage fees, approximately $21,097.
Water and ice analyses fees, approximately $14,000.
Publications issued by health department:
Biennial report
Weekly morbidity report.

KENTUCKY STATE DEPARTMENT OF HEALTH

Department of health:
F. M. Howard, M. D , president, Harlan.
George S. Coon, M D., Louisville.
A. T McCormack, M D., secretary, Louisville.
J Watts Stovall, M. D , Grayson.
John H Blackburn, M. D , Bowling Green.
W. H. Fuller, M. D., Mayfield.
E. L. Gates, M. D., Greenville.
C. J Johnson, D. O., Louisville.
——————
Executive officer:
*A. T. McCormack, M. D., D. P. H., State health commissioner, Louisville.
Bureau of county health work:
*P. E. Blackerby, M. D., assistant State health commissioner, Louisville.
*V. A. Stilley, M. D., field director, Benton.
*W. F Lamb, M D., field director, Russellville.
*D. A. Reekie, M. D., field director, Louisville.
*Juanita Jennings, M. D., field director, Louisville
Bureau of vital statistics:
*J. F. Blackerby, director, Louisville.
Bureau of bacteriology:
*Lillian H South, M. D., director, Louisville.
Bureau of sanitary engineering:
* F C. Dugan, C. E , director, Louisville.
Bureau of foods, drugs, and hotels:
*Sarah Vance Dugan, director, Louisville.
Bureau of venereal diseases:
——————
Bureau of public health nursing:
*Margaret L. East, R N., director, Louisville.
Bureau of maternal and child health:
*C. B. Crittenden, M. D., acting director, Louisville.
Bureau of prevention of trachoma and blindness:
United States Trachoma Hospital:
*Robert Sory, M. D., medical officer in charge.
Bureau of budget:
*Elva V. Grant, director, Louisville.
Bureau of epidemiology:
*F. W. Caudill, M. D., director, Louisville.
Bureau of tuberculosis:
*John B. Floyd, M. D , director, Louisville.
State tuberculosis sanatorium:
*Paul A. Turner, M. D., director and superintendent, Louisville.
Bureau of dental health:
J. F. Owen, D. D. S., director, Lexington.
Bureau of public health education:
*John W. Kelly, director.
*Mayme Sullivan, chief clerk.
Bureau of medical registration:
*John G. South, M. D., director, Louisville.

Appropriations for fiscal year ending June 30, 1938:

Central administration for all departments	$157,500
Full-time county health departments	285,170
State tuberculosis sanatorium	44,000
Total	486,670

LOUISIANA DEPARTMENT OF HEALTH

State board of health:
- J. A. O'Hara, M. D., president, New Orleans.
- S. E. Graham, M. D., Melville.
- S. J. Couvillon, M. D., Moreauville.
- Jas. C. Sartor, M. D., Rayville.
- (Other members to be appointed.)
- Fannie B. Nelken, secretary.

Executive health officer:
- *J. A. O'Hara, M. D., president, State board of health, New Orleans.

Bacteriologist:
- *W. H. Seemann, M. D., New Orleans.

Registrar of vital statistics:
- *P. A. Kibbe, M. D., New Orleans.

Bureau of communicable diseases:
- C. L. Brown, M. D., New Orleans.

Bureau of public health administration:
- *R. W. Todd, M. D., director, New Orleans.

Sanitary engineer:
- *John H. O,Neill, New Orleans.

Analyst:
- *Cassius L. Clay, New Orleans.

Sanitary inspection:
- *Peter Rohrs, Jr., chief, New Orleans.

Auditor:
- *Phil Arras, New Orleans.

Appropriations for fiscal years:

1936–37	$430,000
1937–38	430,000

Publications issued by health department:
- Quarterly bulletin
- Biennial report
- Miscellaneous leaflets.

MAINE DEPARTMENT OF HEALTH AND WELFARE

Advisory council of health and welfare:
- Miss Sally P. Moses, Bangor.
- George W. Lane, Jr., Auburn.
- Mrs. Helen C. Donahue, Portland.
- E. V. Call, M. D., Lewiston.
- Irving E. Pendleton, D. M. D., Lewiston.

Bureau of health:
- *George H. Coombs, M. D., director, Augusta.
- *Roscoe L. Mitchell, M. D., deputy director, Augusta.

Division of administration:
- *George H. Coombs, M. D., director, Augusta.

Division of communicable diseases:
- *Roscoe L. Mitchell, M. D., Augusta.

Division of laboratories:
- *A. H. Morrell, M. D., Augusta.
  - Aroostook county branch laboratory:
    - C. S. Kingsley.

Division of sanitary engineering:
- *Elmer W. Campbell, D. P. H., Augusta.

Division of vital statistics:
- *George H. Coombs, M. D., State registrar, Augusta.

Division of social hygiene:
- *George H. Coombs, M. D., director, Augusta.
- Benjamin B. Foster, M. D., consultant, Portland.
- Harrison J. Hunt, M. D., consultant, Bangor.

Division of public health nursing and child hygiene:
- *Edith L. Soule, R. N., director, Augusta.
- *Helen N. Kienzle, R. N., assistant director, Augusta.

Division of dental hygiene:
- *Dorothy Bryant, D. H., Augusta.

Division of crippled children:
- *Herbert R. Kobes, M. D., Augusta.

Division of maternal and child health:
- *Roscoe L. Mitchell, M. D., acting director, Augusta.

Health unions:
- Cooperative health union:
  - B. L. Arms, M. D., Farmington.
- Motbov health union (Milford, Old Town, Bradley, Orono, Veazie):
  - Howard L. Jackson, M. D., Old Town.

District health officers:
- *J. L. Pepper, M. D., South Portland.
- *C. N. Stanhope, M. D., Dover-Foxcroft.
- *J. W. Loughlin, M. D., Rockland.
- *B. F. Porter, M. D., Caribou.
- *J. A. MacDonald, M. D., Machias.

Appropriations for fiscal year ending June 30, 1938:

Administration	$60,500
District and local health officers	27,500
Venereal-disease control work	11,300
Maternity and child-welfare work	26,000
Branch State laboratory, Caribou	3,400
Aid for typhoid carriers	5,300
Infantile paralysis control	2,000
Pneumonia control	4,000
Total	140,000

Other sources of revenue:
- Census Bureau, Washington, D. C., and miscellaneous receipts, about $2,000.
- License fees for camps, eating and lodging places, etc., about $34,000 (estimated).

MARYLAND DEPARTMENT OF HEALTH

Board of health:
- Robert H. Riley, M. D., Dr. P. H., chairman, Baltimore.
- Thomas S. Cullen, M. D., Baltimore.
- Herbert R. O'Conor, attorney general, Baltimore.
- Joseph Irwin France, M. D., Port Deposit.
- Huntington Williams, M. D., Dr. P. H., Baltimore.
- Frederick A. Allner, C. E., Baltimore.
- Benjamin C. Perry, M. D., Bethesda.
- E. F. Kelly, Phar. D., Baltimore.
- George M. Anderson, D. D. S., Baltimore.

Executive health officer:
- *Robert H. Riley, M. D., Dr. P. H., director of health, Baltimore.

Division of personnel and accounts:
- *Walter N. Kirkman, chief, Baltimore.

Division of oral hygiene:
- *Richard C. Leonard, D. D. S., chief, Baltimore.

Division of legal administration:
- *J. Davis Donovan, LL. B., chief, Baltimore.

Committee on public health education:
- *Gertrude B. Knipp, secretary, Baltimore.

Bureau of communicable diseases:
- *Robert H. Riley, M. D., Dr. P. H., chief, Baltimore.
- *C. H. Halliday, M. D., epidemiologist, Baltimore.
- *C. W. G. Rohrer, M. D., Ph. D., diagnostician, Baltimore.

Bureau of vital statistics:
- *Arthur W. Hedrich, chief, Baltimore.

Food and drug commissioner:
- *A. L. Sullivan, chief, Baltimore.

Deputy food and drug commissioner:
- *R. L. Swain, Phar. D., LL. B.

Bureau of bacteriology:
- *C. A. Perry, chief, Baltimore.

Bureau of sanitary engineering:
- *Abel Wolman, B. S. E., chief, Baltimore.

Bureau of chemistry:
- *William F. Reindollar, chief, Baltimore.

Bureau of child hygiene:
- *J. H. Mason Knox, Jr., Ph. D., M. D., chief, Baltimore.

Appropriations for fiscal year ending September 30, 1938, $455,691.

Publications issued by health department:
- Annual report.
- Weekly News Letter.
- Monthly bulletin.

MASSACHUSETTS DEPARTMENT OF PUBLIC HEALTH

Public health council:
Henry D. Chadwick, M. D., chairman, Boston.
Richard M. Smith, M. D., Boston.
Francis H. Lally, M. D., Milford.
Richard P. Strong, M. D., Boston.
Charles F. Lynch, M D., Springfield.
James L. Tighe, Holyoke.
George D. Dalton, M. D., Quincy.
Executive health officer:
***Henry D. Chadwick, M. D.**, State commissioner of public health, Boston.
Secretary:
*Florence L. Wall.
Division of administration:
(Under direction of commissioner.)
Division of communicable diseases:
*Gaylord W. Anderson, M. D., director, Boston.
Division of sanitary engineering:
*Arthur D. Weston, C. E., director and chief engineer, Boston.
Division of biologic laboratories:
*Elliott S. Robinson, M. D, director and pathologist, Boston.
Division of food and drugs:
*Hermann C. Lythgoe, director and analyst, Boston.
Division of child hygiene:
*M. Luise Diez, M D., director, Boston.
Division of tuberculosis sanatoria.
*Alton S. Pope, M. D., director, Boston.
Division of adult hygiene:
*Herbert L. Lombard, M D, director, Boston.
Division of genitoinfectious diseases:
*Nels A. Nelson, M. D, director, Boston.

Appropriations for department of public health, 1937:

Division of administration.	
Salary of commissioner	$7, 500
Personal services	20, 955
Services other than personal	9, 500
Division of child and maternal hygiene:	
Personal services of director and assistants	65, 300
Services other than personal	25, 000
Division of communicable diseases:	
Personal services of director, district health officers, etc	77, 300
Services other than personal	15, 200
Hospitalization chronic rheumatism	9, 000
Division of genitoinfectious diseases:	
Personal services	13, 305
Expenses in connection with control of genitoinfectious diseases	79, 000
Wassermann Laboratory:	
For personal services	18, 700
For expenses of laboratory	6, 000
Antitoxin and vaccine laboratory:	
For personal services	80, 000
Other services	36, 500
Inspection of food and drugs:	
For personal services	62, 900
Other services	12, 300
For administering the shellfish law:	
Personal services	2, 220
Other services	870
Water supply and disposal of sewage:	
For personal services	130, 570
For other services	27, 300
Division of tuberculosis:	
For personal services	40, 155
Services other than personal	4, 000
For personal services of tuberculosis clinic units	35, 300
Services other than personal (clinic units)	12, 000
Payment of subsidies	456, 000
For maintenance of and for certain improvements at the Lakeville, North Reading, Rutland, and Westfield State sanatoria	1, 514, 490
Division of adult hygiene:	
For personal services	47, 900
For other expenses	49, 500
Cancer hospital at Norfolk:	
For maintenance of and for certain improvements	370, 050
Total	3, 228, 815

MICHIGAN DEPARTMENT OF HEALTH

Advisory council of health:
U. G. Rickert, D D. S., Ann Arbor.
Louis J. Hirschman, M. D., Detroit.
George J. Curry, M. D., Flint.
Executive health officer:
***C. C. Slemons, M. D., Dr. P. H.**, State health commissioner, Lansing.
Bureau of engineering:
*Edward D Rich, C. E., director.
*Willard F. Shepard, assistant engineer.
*Raymond J Faust, C E., assistant engineer.
*Orla E. McGuire, assistant engineer.
*LaRue L Miller, assistant engineer.
*Robert J Smith, assistant engineer.
*John E Miller, assistant engineer.
Bureau of laboratories:
*C. C. Young, Ph. D, D. P. H., director.
**Wm. E. Bunney, Ph. D., associate director, biologic products division.
*Minna Crooks, bacteriologist, associate director.
*G. D. Cummings, Ph. D, assistance director.
*Pearl L Kendrick, associate director, Western Michigan division.
*Ora M Mills, associate director, Upper Peninsula division
*A. Exworthy, analytical chemist.
*Russell Y. Gottschall, Ph D., bacteriologist.
*A B Haw, physiological chemist.
*M. B Kurtz, D. V M., serologist.
*C. B Line, D V. M, veterinary pathologist.
*D B. Meyer, D V. M., veterinarian.
*J T Tripp, Ph D, physiological chemist.
*Beulah D Westerman, Ph. D, bacteriologist.
*M. M. Woodward, toxicological chemist.
Bureau of child hygiene and public health nursing:
*Lillian R Smith, M. D, director.
*G B. Cornelinson, M D., associate director.
*Emily L. Ripka, M. D., field physician.
*Berneta Block, M. D, field physician.
*Mabel G Munro, R. N, consultant, maternal and child health nursing.
*Helen de Spelder Moore, R N., chief nurse division of nursing.
Bureau of records and statistics:
*W. J. V Deacon, M D, director.
*Stuart T. Friant, statistician.
Bureau of education:
*Marjorie Delavan, director.
*Pearl Turner, assistant director.
*Wilbur J Myers, charge of publications.
*Leah Baldwin, librarian.
*Melita Hutzel, lecturer.
Bureau of communicable diseases:
*C D. Barrett, M. D., C. P. H., director.
*Philip Forsbeck, M. D., associate director, in charge of pneumonia control.
*A. W. Newitt, M. D, C. P. H., field epidemiologist, in charge of tuberculosis control.
*Russell E. Pleune, M. D, M. P. H., field epidemiologist, in charge of venereal disease control.
Richard Sears, M. D., field epidemiologist.
Bureau of mouth hygiene.
*William R. Davis, D. D. S., director.
*Ronald B. Fox, D. D. S., assistant.
*Ruth F. Rogers, D. H., assistant.
Bureau of county health administration:
*A. B. Mitchell, M. D., director.
Bureau of industrial hygiene:
*John Hepler, C. E., director.
*Paul F. Rezin, chemical engineer.
*Richard W. Colina, sanitary engineer.

Appropriations for fiscal year ending June 30, 1938:

Commissioner	$6, 000
Other personal service	124, 000
Supplies, material, and contractual service	54, 300
Outlay for equipment	4, 000
County health units	109, 500
Beaver Island physician	2, 800
Venereal disease control	45, 000
	345, 600
Laboratory:	
Personal service	127, 000
Supplies, material, and contractual service	59, 000

Appropriations for fiscal year ending June 30, 1938—Continued.

Laboratory—Continued.

Outlay for equipment	$2,000
Smallpox vaccine, toxoid manufacture	5,000
Antipneumococcus serum	30,000
Land and structures	6,500
	229,500

Publications issued by health department:
- Monthly bulletin.
- Annual report.
- Communicable-disease pamphlets.
- Sex-hygiene pamphlets.
- Child-hygiene pamphlets.
- Engineering bulletins.
- Mouth-hygiene pamphlets.
- Rules and regulations.

MINNESOTA DEPARTMENT OF HEALTH

Board of health:
- Frederic Bass, C. E., president, Minneapolis.
- Gustav Bachman, Ph. D., Minneapolis.
- N. G. Mortensen, M. D., St. Paul.
- S. Z. Kerlan, M. D., Aitkin.
- E. T. Fitzgerald, M. D., Morris.
- Thomas G. Bell, Duluth.
- Erling S. Platou, M D., Minneapolis.
- C. L. Melby, D. C., Owatonna.
- W. A. Brand, M. D., Redwood Falls.

Executive health officer, State Office Bldg., St. Paul:
- *A. J. Chesley, M. D., secretary and executive officer.

Division of administration, State Office Bldg., St. Paul:
- *O. C. Pierson, director.

Division of vital statistics, State Office Bldg., St. Paul:
- *Gerda C. Pierson, director.

Division of hotel inspection, State Office Bldg., St. Paul:
- *Laura E. Naplin, State hotel inspector

Division of preventable diseases (including venereal diseases), University Campus, Minneapolis:
- *O. McDaniel, M. D., director.
- *Lucy Heathman, Ph. D., M. D., assistant director, and chief of laboratories.
- *Ralph R. Sullivan, M D., senior epidemiologist.

Division of sanitation, University Campus, Minneapolis:
- *H. A. Whittaker, director.
- *O. E Brownell, C E., senior sanitary engineer.

Division of child hygiene, university campus, Minneapolis:
- Everett C. Hartley, M. D., director.
- *Olivia T. Peterson, R. N., superintendent of public-health nursing
- *Vern D. Irwin, D. D. S., superintendent, dental health education.

Local health services, State office building, St. Paul:
- *Robert N. Barr, M. D., C. P. H., director.

Appropriations for fiscal years ending June 30, 1938 and 1939:

	1938	1939
Divisions of administration and vital statistics.		
Salaries	$32,500	$33,500
Expenses	5,000	7,000
Providing free antitoxin and other biologics	12,000	14,000
For aid to typhoid carriers		4,500
Division of preventable diseases:		
Preventable diseases and laboratory	74,000	76,000
Venereal disease control and venereal disease education	24,000	24,000
Division of sanitation		
Sanitary engineering and laboratory	27,500	27,500
Stream pollution survey	11,000	11,000
Division of child hygiene		
Protection for maternity and infancy	20,000	20,000
Indian health work	8,000	10,000
Division of hotel inspection:		
Hotel inspection	45,000	45,000
Total	259,000	272,500

Publications issued by health department:
- Educational pamphlets.

MISSISSIPPI STATE BOARD OF HEALTH

Board of health:
- J. W. Lipscomb, M. D., president, Columbus.
- Felix J. Underwood, M. D., secretary, Jackson.
- S. E. Eason, M. D., New Albany.
- L. B. Austin, M. D., Rosedale.
- H. L. McKinnon, M. D., Hattiesburg.
- B. J. Shaw, M. D., Slate Spring.
- L. W. Brock, M. D., McComb.
- John B. Howell, M. D., Canton.
- W. H. Banks, M. D., Philadelphia.
- William R. Wright, D. D. S, Jackson.

Executive health officer.
- *Felix J. Underwood, M. D., secretary, State board of health, Jackson.

Vital statistics:
- *R. N. Whitfield, M. D., director, Jackson.

Child hygiene and public health nursing:
- *Felix J. Underwood, M. D., acting director, Jackson.
- *Mary D. Osborne, R. N., associate director, public health nursing, Jackson.
- *Gladys Eyrich, supervisor, oral hygiene, Jackson.

Hygienic laboratory:
- *T. W. Kemmerer, M. D., director, Jackson.

Sanitary engineering
- *H. A Kroeze, C E., director, Jackson.
- *N M. Parker, D. V. S., State meat and milk supervisor, Jackson.
- *C. M Ledbetter, assistant State sanitary engineer, Jackson.
- *Floyd Ratliff, State sanitary inspector, Jackson.

County health work:
- *H. C. Ricks, M. D., C. P. H., director, Jackson.
- *John A. Milne, M. D., M. P. H., assistant director, Jackson.
- *Ora E. Phillips, R. N., supervising nurse.
- *Joseph E Johnston, field supervisor of sanitation, Jackson.

Tuberculosis control:
- *Henry Boswell, M. D., director, Sanatorium.
- *W. D Hickerson, M. D., clinician, field tuberculosis diagnostic unit, Sanatorium.

Industrial hygiene
- *J W. Dugger, M. D., director, Jackson.

Epidemiological unit:
- *A. L Gray, M D., M. P. H., director, Jackson.
- *Catherine Mayfield, bacteriologist.
- *Margaret Meade, nurse-investigator.

Health education.
- *Eva Moore Adams, supervisor.
- *Louise Williams, librarian.

State appropriations for period July 1, 1936, to June 30, 1937, $175,000; July 1, 1937, to June 30, 1938, $175,000.

Publications issued by health department:
- Biennial report.
- Health pamphlets.

MISSOURI STATE BOARD OF HEALTH

Board of health:
- E. Sanborn Smith, M. D., president, Kirksville.
- W. L. Brandon, M. D., vice president, Poplar Bluff.
- T S. Bourke, M. D., Kansas City.
- Malberne, B. Clopton, M. D., St. Louis.
- L. Paul Forgrave, M. D., St. Joseph.
- Harry F. Parker, M. D., secretary, State health commissioner, Jefferson City.

Executive health officer:
- *Harry F. Parker, M. D., State health commissioner, Jefferson City.
- *W. H. Dorsey, business administrator and accountant.

Veneral disease control:
- *Robert D Wright, M. D., director.

Local health work:
- *John W. Williams, Jr., M. D., C. P. H., director.

Child hygiene:
- *James W. Chapman, M. D., director.

Laboratories:
- *C. F. Adams, B. Agr., M. D., director.

Sanitary engineering:
- *W. Scott Johnson, director.

Vital statistics:
- *Thomas W. Chamberlain, director.

Medical licensure:
*Herman S. Gove, M. D., director.
Public health nursing:
*Helena A. Dunham, R. N., director.
Cosmetology and hairdressing:
*Nellie L. Killion, director.
Food and drug department:
*Frank A. Barnes, bookkeeper.
Appropriations for the State board of health, biennial period 1937-38:

State board of health:	
Additions	$16,000
Operation	77,500
Personal service	213,220
Total	306,720
Medical licensure:	
Operation	10,000
Personal service	15,000
Total	25,000
Water and sewage:	
Operation	8,000
Personal service	7,000
Total	15,000
Cosmetology and hairdressing:	
Additions	300
Operation	27,900
Repairs and replacements	200
Personal service	50,280
Total	78,680
Food and drugs:	
Operation	38,000
Personal service	80,920
Total	118,920

MONTANA DEPARTMENT OF PUBLIC HEALTH

Board of health:
B. L. Pampel, M. D., president, Livingston.
L. H. Fligman, M. D., Helena.
George F Turman, M. D., Missoula.
E. M. Porter, M. D., Great Falls.

W. F. Cogswell, M. D., secretary, Helena.
Executive health officer:
*W. F. Cogswell, M. D., secretary, Helena.
Division of communicable diseases:
*B. K. Kilbourne, M. D., epidemiologist and director of county health work, Helena.
Division of child welfare:
*Jessie M. Bierman, M. D., director, Helena.
Division of food and drugs:
*J. W. Forbes, director, Helena.
Division of vital statistics:
*W. F. Cogswell, M. D., State registrar, Helena.
*L. L. Benepe, deputy State registrar, Helena.
Division of water and sewage:
*H. B. Foote, director, Helena.
W. M. Cobleigh, consulting sanitary engineer, Bozeman.
*Ludwig Champa, analyst, Helena.
*C. W. Brinck, assistant sanitary engineer, Helena.
Hygienic laboratory:
*Edith Kuhns, acting director, Helena.
E. D. Hitchcock, M. D., consulting bacteriologist, Great Falls.
Appropriations for the years ending June 30:

	1936	1937
Salaries	$23,300	$35,000
Operating expenses	15,750	14,500
Capital repairs and replacements	500	300
Division of child welfare	10,500	9,000
Board of entomology (Rocky Mountain spotted-fever work)	3,000	500
Total	53,050	59,300

NEBRASKA DEPARTMENT OF HEALTH

Executive health officer:
*P. H. Bartholomew, M. D., acting director of health, Lincoln.
Collaborating epidemiologist:
*P. H. Bartholomew, M. D., Lincoln.
Public health laboratory:
*L. L. Vose, bacteriologist, Lincoln.
Division of sanitary engineering:
*T. A. Filipi, public health engineer, Lincoln.
Division of venereal diseases:
*P. H. Bartholomew, M. D., director, Lincoln.
*Edmund G. Zimmerer, M. D., assistant epidemiologist, Lincoln.
Division of vital statistics:
*Jean Barrett, Lincoln.
Division of maternal and child health:
*J. Warren Bell, M. D., director, Lincoln.
Medical examining board:
W. R. Boyer, M. D., Pawnee City.
H. J. Lehnhoff, M. D., Lincoln.
P. A. DeOgny, M. D., Milford.

Appropriations for biennial period ending June 30, 1939:

Salary of director	$6,400
Salaries	29,000
Maintenance	12,000
Special:	
Public health work	20,000
Maternal and child health	32,000
Public health education in tuberculosis and venereal disease	6,000
Total	105,400

NEVADA STATE BOARD OF HEALTH

State board of health:
Richard Kirman, Sr., Governor, president, Carson City.
John E. Worden, M. D., secretary and State health officer, Carson City.
Malcolm McEachin, secretary of State.
John Fuller, M. D., Reno.
C W West, M D., Reno.
Executive health officer:
John E. Worden, M. D., State health officer, Carson City.
Division of communicable disease control:
*A. Floyd Gardner, M. D., C. P. H., director, Carson City.
Division of sanitary engineering:
*Wm Wallace White, E. M., C. P. H. E., director, Carson City.
Division of maternal and child health:
*H. Earl Belnap, M. D., director, Carson City.
State hygienic laboratory at State university:
*Vera E Young, acting director, Reno.
Appropriations for period from July 1, 1937, to June 30, 1939:

Salary of secretary	$5,000
Salary of clerk	3,600
Traveling expenses	1,000
Office supplies, heat, rent, and light	1,550
Record books for county registrars	300
Equipment	200
Registration of births and deaths	350
Purchase of diptheria and other dangerous disease antitoxin	500
Total	12,500

Publications issued by health department:
Biennial report.
Special bulletins.

NEW HAMPSHIRE STATE BOARD OF HEALTH

Board of health:
George C. Wilkins, M. D., Manchester.
Barbara Beattie, M. D., Littleton.
Francis P. Murphy, governor, Nashua (ex officio).
Thomas P. Cheney, attorney general, Laconia. (ex officio).
James W. Jameson, M. D., Concord.
Percy A. Shaw, Manchester.
Executive health officer:
*T. P. Burroughs, M. D., secretary, Concord.

Division of maternal and child health:
*Byron H. Farrall, M. D., director, Boscawen.
Crippled children's services:
*Byron H. Farrall, M. D., director, Boscawen.
Department of vital statistics:

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Division of chemistry and sanitation:
*Charles D. Howard, chief, Concord.
*Frederick Vintinner, assistant chemist, Concord.
*Harriet I. Albee, assistant chemist and bacteriologist, Concord.
*Leonard W. Trager, sanitary engineer, Concord.
*Joseph X. Duval, chief inspector, Concord.
*Russell A. Eckloff, sanitary inspector, Concord.
Diagnostic and pathological department:
*William R. Macleod, serologist and diagnostic bacteriologist, Concord.
H. N. Kingsford, M. D., pathologist, Hanover.
*Benjamin Jewell, assistant in pathological laboratory, Concord.
Venereal disease division:
*Charles A. Weaver, M. D., Manchester.
Appropriations for fiscal year ending June 30, 1938:

State board of health	$60,540
Laboratory of hygiene	20,020
Vital statistics	4,730
Total	$85,290

Publications issued by health department:
Bulletin "Health News."
Biennial report.

NEW JERSEY DEPARTMENT OF HEALTH

Board of health:
Irvin E. Deibert, M. D., president, Camden.
Mrs. Helen M. Berry, vice president, Newark.
Margaret L. MacNaughton, Jersey City.
Joseph N. Fowler, Bivalve.
E. W. Smillie, V. M D., Plainsboro.
J. E. H. Guthrie, D. D S, Newark.
Clyde Potts, C. E., Morristown.
John V. Bishop, Columbus.
James E. Russell, Trenton.
Stanley H. Nichols, M. D., Asbury Park.
Augustus L L Baker, M. D., Dover.
Executive health officer:
***J. Lynn Mahaffey, M. D.,** director of health, Trenton.
Bureau of bacteriology:
*John V. Mulcahy, chief, Trenton.
Bureau of chemistry:
*John E. Bacon, chief, Trenton.
Bureau of administration:
*Edmund R. Outcalt, acting chief, Trenton.
Bureau of food and drugs:
*Walter W. Scofield, chief, Trenton.
Bureau of child hygiene:
Julius Levy, M. D., consultant, Trenton.
Bureau of local health administration:
*Wm. H. MacDonald, chief, Trenton.
Bureau of engineering:
*H. P. Croft, chief, Trenton.
Bureau of vital statistics:
*David S. South, chief, Trenton.
Bureau of venereal disease control:
A. J. Casselman, M D., consultant, Trenton.
Appropriations for fiscal year ending June 30, 1938:

Salaries	$229,370
Miscellaneous	64,315
Child hygiene	100,415
Venereal disease control	25,540
Other special appropriations	65,605
Total	485,245

Publications issued by health department:
Bi-monthly bulletin.
Annual report.

NEW MEXICO DEPARTMENT OF PUBLIC HEALTH

Board of public health:
E. W. Fiske, M. D., chairman, Santa Fe.
Eugene P. Sims, M. D., vice chairman, Alamogordo.
E. P Moore, secretary, Santa Fe.
M. K. Wylder, M. D., Albuquerque.
Mrs. Tobias Espinosa, Espanola.
Executive health officer:
***E. B. Godfrey, M. D., director of public health,** Santa Fe.
Division of sanitary engineering and sanitation:
*Paul S. Fox, M S. in C. E., chief, Santa Fe.
Division of county health work:
*C. H. Douthirt, M. D., director, Santa Fe.
Division of epidemiology:
*E. F. McIntyre, M. D., C. P. H., epidemiologist, Santa Fe.
Division of maternal and child health:
*Hester B. Curtis, M. D., M. P. H., director, Santa Fe.
State supervisor of public health nursing:
*Mrs Fannie T. Warncke, R. N., Santa Fe.
Division of health education:
*Charles M. Cree, chief, Santa Fe.
Public health laboratory:
*Miss Myrtle Greenfield, chief, Albuquerque.
State registrar:
*Miss Billy Tober, Santa Fe.
Appropriation for years 1937-38 and 1938-39, per annum, $59,500. Fiscal year ends June 30.

NEW YORK STATE DEPARTMENT OF HEALTH

Public-health council:
Simon Flexner, M. D., LL. D., chairman, New York
Homer Folks, LL. D., vice chairman, Yonkers.
Livingston Farrand, M. D., LL D., Ithaca.
Walter A Leonard, M. D, Cambridge.
Henry N. Ogden, C. E., Ithaca.
Herman G. Weiskotten, M. D., Syracuse.
George Baehr, M D., New York.
Clayton W. Greene, M. D., Buffalo.
Edward S. Godfrey, Jr., M. D. (ex officio), commissioner of health, Albany.
Executive health officer:
***Edward S. Godfrey, Jr., M. D.,** State commissioner of health, Albany.
Deputy commissioner of health:
*Paul B. Brooks, M. D, Albany.
Assistant commissioner for local health administration:

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Assistant commissioner for preventable diseases:
*George H. Ramsey, M. D., Albany.
General superintendent of tuberculosis hospitals:
*Robert E Plunkett, M. D.
Administrative officer:
*Edmund Schreiner, LL. B, Albany.
Administrative finance officer:
*Clifford C. Shoro, Albany.
Division of public health education:
*B. R. Rickards, director, Albany.
Division of sanitation:
*Charles A. Holmquist, C. E., director, Albany.
Division of vital statistics.
*Joseph V. de Porte, Ph D., director, Albany.
Division of maternity, infancy, and child hygiene:
*Elizabeth M. Gardiner, M. D., director, Albany.
Division of communicable diseases:

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Division of tuberculosis:
*William Siegal, M. D., director, Albany.
Division of syphilis control:
*William A. Brumfield, M. D., director, Albany.
Division of laboratories and research:
*August B. Wadsworth, M. D., director, Albany.
Division of public health nursing:
*Marion W. Sheahan, R. N., director, Albany.
Division of orthopedics:
*Walter J. Craig, M. D., director, Albany.
Division of cancer control:
*Burton T. Simpson, M. D., director.
State institute for the study of malignant diseases, Buffalo:
*Burton T. Simpson, director.
New York State Hospital for Incipient Pulmonary Tuberculosis, Ray Brook:
*H. A. Bray, M. D., superintendent.
New York State Reconstruction Home, West Haverstraw:
*John B. Kelly, superintendent.
Homer Folks Tuberculosis Hospital, Oneonta:
*Ralph Horton, M. D., superintendent.

New York State Tuberculosis Hospital, Mount Morris:
*N. Stanley Lincoln, M. D., superintendent.
Herman M. Biggs Memorial Hospital, Ithaca:
*John K. Deegan, M. D., superintendent.
Appropriations for fiscal year ending June 30, 1938:

Personal service	$2,348,600
Maintenance and operation	1,596,168
State aid to county laboratories	110,000
State aid to county health activities	611,268
Construction and permanent betterments	1,186,800
Pneumonia control	400,000
Total	6,252,836

Other sources of revenue:

Fees from certified transcripts of birth, death, and marriage certificates, per annum	5,892
Marriage license applications	36,965
Licensing laboratories	392
Sale of serums	2,893
Licensing of embalmers and undertakers	4,772
Registration of embalmers and undertakers	25,800
Rental of radium	71
Miscellaneous receipts	284
Care of county cases at reconstruction home	389,252
Refund of transportation of discharged patients from tuberculosis hospitals, Ray Brook	3,543
Care of county patients at Homer Folks Tuberculosis Hospital, Oneonta	76,516
Care of county patients at Mt Morris Tuberculosis Hospital, Mt. Morris, N. Y.	55,734
Care of county patients at Herman M. Biggs Memorial Hospital, Ithaca, N. Y.	21,427

Publications issued by health department:
Weekly Health News.
Monthly Vital Statistics Review.
Annual Report.

NORTH CAROLINA STATE BOARD OF HEALTH

Board of health:
S. D. Craig, M. D., president, Winston-Salem.
J. N. Johnson, D. D. S., vice president, Goldsboro.
G. G Dixon, M. D., Ayden.
H. Lee Large, M. D., Rocky Mount.
H. G. Baity, Chapel Hill
W. T. Rainey, M. D., Fayetteville.
Hubert B. Haywood, M. D., Raleigh.
James P. Stowe, Ph. G., Charlotte.
John LaBruce Ward, M. D., Asheville.
Executive health officer:
***Carl V. Reynolds, M. D.**, secretary-treasurer and State health officer, Raleigh.
Division of preventive medicine:
*G. M. Cooper, M. D., director, and assistant State health officer, Raleigh.
*Roy Norton, M. D., assistant director, Raleigh
*James T. Barnes, State supervisor of crippled children, Raleigh.
(a) Maternity and infancy.
(b) Health education.
(c) School health supervision.
(d) Crippled children.
Division of oral hygiene:
*Ernest A. Branch D. D. S., director, Raleigh.
Division of sanitary engineering:
*Warren H. Booker, C. E., director, Raleigh.
Division of laboratories:
John H. Hamilton, M. D., director, Raleigh.
Division of epidemiology:
*J. C. Knox, M. D., M. P. H., director, Raleigh.
*G. M. Leiby, M. D., venereal disease control officer.
Division of county health work:
*R. E. Fox, M. D., M. P. H., director, Raleigh.
*Walter J. Hughes, M. D., field agent.
Division of vital statistics:
*R. T. Stimpson, M. D., director, Raleigh.
Division of industrial hygiene:
*H. F. Easom, M. D., director, Raleigh.
*R. L. Robinson, M. D., assistant director, Raleigh.
Appropriation for fiscal year ending June 30, 1938, $323,200.
Other sources of revenue: Special fees, $61,366.

NORTH DAKOTA STATE DEPARTMENT OF HEALTH

Advisory health council:
John Crawford, M. D., New Rockford.
Agnes Stucke, M. D., Garrison.
C D. Dursema, D. D. S., Bismarck.
P. O. Sathre, attorney general, ex officio, Bismarck.
Arthur E. Thompson, superintendent of public instruction, ex officio, Bismarck.
Maysil M. Williams, M. D., C. P. H., State health officer.
Executive health officer:
***Maysil M. Williams, M. D., C. P. H.**, State health officer, Bismarck
Division of child hygiene and public health nursing:
*August C Orr, M. D., director
*Margrete Skaarup, R. N., supervisor, public health nursing
Division of preventable diseases:
*John A. Cowan, M. D., director.
Division of vital statistics:
*Margaret D Lang, director.
Division of sanitary engineering:
*Mark D Hollis, C E., director.
Division of laboratories:
*Melvin E Koons, director, Grand Forks.
Appropriations for biennial period ending June 30, 1939
State department of health:

Salary of State health officer	$6,000
Epidemiologist	4,800
Vital statistician	2,640
Sanitary engineer	5,000
Chief clerk	3,000
Stenographers	8,640
Clerks	3,840
Postage	2,000
Office supplies	1,500
Furniture and fixtures	1,000
Printing	2,500
Miscellaneous	1,000
Travel expense	7,600
Card indexing	3,000
Arsenicals	6,000
Automobile	500
	59,020

Public health laboratories:

Postage	1,000
Office supplies	400
Furniture and fixtures	2,000
Printing	500
Miscellaneous	1,500
Travel	300
Laboratory supplies	4,000
Emergency	1,000
Bismarck laboratory:	
Director and first technician	5,000
Second technician	2,800
Stenographer	1,920
Dishwasher	300
Grand Forks laboratory:	
First technician	5,000
Second technician	2,800
Stenographer	1,920
Dishwasher	300
	30,740

Division of child hygiene:

Salary, director of division	7,200
Supervisor—public health nurses	4,800
Assistant supervisor—public health nurses	4,200
Physician for pre-school conferences	3,000
Stenographers	4,320
Postage	1,000

Appropriations for biennial period ending June 30, 1939—Continued.
Division of child hygiene—Continued.

Office supplies	$600
Furniture and fixtures	200
Printing	3,000
Miscellaneous	400
Travel expense	7,800
Biologicals	2,500
	39,020
Total	128,780

OHIO DEPARTMENT OF HEALTH

Public health council:
Walter H. Hartung, M. D., chairman, Columbus.
F. E. Mahla, M D., secretary, Columbus.
Warren C. Breidenbach, M. D., Dayton.
H. G. Southard, M. D., Marysville.
W. I. Jones, D. D. S., Columbus.
A. Julius Freiberg, LL. B., Cincinnati.
Executive health officer:
*Walter H. Hartung, M. D., director of health, Columbus.
Assistant director of health:
*F. E. Mahla, M. D
Division of administration:
*F. E. Mahla, M. D., chief.
*C. A. Orrison, chief clerk.
Bureau of local health organization:
*R W. DeCrow, M. D., chief.
Division of communicable diseases:
*Finley Van Orsdall, M. D., chief.
Bureau of tuberculosis:
*W. J. Smith, M. D., chief.
Bureau of prevention of blindness and venereal disease control:
*W. P. Johnson, M. D., chief.
Division of sanitary engineering:
*F. H. Waring, B S. in C. E. and S. E., chief.
Bureau of plumbing inspection:
*R. T. Barrett, chief
Division of vital statistics:
*Irva O. Plummer, chief.
Division of laboratories:
*Leo F. Ey, chief.
Division of hygiene:
———— ————
Bureau of hospitals:
*Clara E. Reeder, R. N., chief.
Bureau of occupational diseases and industrial hygiene:
———— ————
Bureau of child hygiene:
———— ————
Bureau of dental hygiene:
*D. L. Houser, D D. S., chief.
Division of public health nursing:
*S. Gertrude Bush, R. N., chief.
Appropriations for 12 months ending Dec. 31, 1937:

Personal services	$189,500
Maintenance	42,177
State aid for health districts	150,000
Total	381,677

Publications issued by health department:
Ohio Health News (monthly).

OKLAHOMA DEPARTMENT OF PUBLIC HEALTH

Executive health officer:
*Charles M. Pearce, M. D., State health commissioner, Oklahoma City.
Assistant State health commissioner:
*J. P. Folan, Oklahoma City.
Bureau of vital statistics:
*Alice L. Talbot, State registrar, Oklahoma City.
*Jo. C. Rose, statistician, Oklahoma City.
Bureau of maternal and child health:
*Paul J. Collopy, M. D., Medical director, Oklahoma City.
*J. T. Bell, M. D., assistant director, Oklahoma City.
*Laura Van De Mark, R. N., director of nurses, Oklahoma City.
Bureau of epidemiology:
*Martin R. Beyer, M. D., director, Oklahoma City.
Bureau of sanitary engineering:
*Henry J. Darcey, director, Oklahoma City.
*Paul Henderson, assistant, Oklahoma City.
*Carl Warkentin, assistant, Oklahoma City.
Bureau of diagnostic laboratories:
*Taylor Rogers, State chemist, director, Oklahoma City.
*Floyd Whipple, bacteriologist, Oklahoma City.
Branch laboratory:
*Frances Kelleam, Tahlequah.
*J. P. Hutchinson, Elk City.
Bureau of venereal disease control:
*R. M. Adams, M. D., director, Oklahoma City.
Bureau of full-time health units and districts:
*Chas. E. Leonard, M. D., director, Oklahoma City.
Bureau of dental education:
*F. P. Bertram, D. D. S., director.
*O. C. Kersey, D. D. S., assistant.
Bureau of tuberculosis control:
*W. P. Murphy, M. D., director.
Bureau of community sanitation and malaria control:
*Hugh Payne, director.
Bureau of milk control.
*Wm. J. Wyatt, director.

Appropriation for fiscal year ending June 30, 1938	$290,250
Appropriation for fiscal year ending June 30, 1939	281,650

OREGON STATE BOARD OF HEALTH

Board of health:
N. E. Irvine, M. D., president, Lebanon.
Arthur W Chance, D. D. S., M. D., vice president, Portland.
Robert L. Benson, M. D., Portland.
Frank R. Mount, M. D., Portland.
F. Floyd South, M. D., Portland.
Archie C Van Cleve, M. D., Portland.
W. J. Weese, M. D., Ontario.
Executive health officer:
*Frederick D. Stricker, M. D., secretary and State health officer, Portland.
Registrar of vital statistics:
*Frederick D Stricker, M. D., Portland.
Division of public health nursing and child hygiene:
Olive M Whitlock, R. N., Portland.
Director of laboratory:
*William Levin, D. P. H., Portland.
Division of sanitary engineering·
Carl E. Green, sanitary engineer.
Appropriations for fiscal year ending December 31, 1937, $40,972.18.
Publications issued by health department:
Annual report.
Biennial report.
Pamphlets and posters.
Weekly letter.

PANAMA CANAL ZONE HEALTH DEPARTMENT

Executive health officer:
*Col. H. C. Pillsbury, Medical Corps, United States Army, chief health officer, Balboa Heights.
*D. P. Curry, M. D., assistant chief health officer, Balboa Heights.
*L. B. Bates, M. D., chief, board of health laboratory, Ancon.
*O. E. Denney, Surgeon, U. S. P. H. S., chief quarantine officer, Balboa Heights.
Appropriation for 1937–1938, $1,665,000.

PENNSYLVANIA DEPARTMENT OF HEALTH

Advisory health board:
Edith MacBride-Dexter, M. D., chairman.
Moses Behrend, M. D., Philadelphia.
R. J. Behan, M. D., Pittsburgh.
E. S. Briggs, M. D., Warren.
Walter S. Brenholts, M. D., Williamsport.
John A. Meehan, D. D. S., New Castle.

Sanitary water board:
Edith MacBride-Dexter, M. D., chairman.
James F. Bogardus, secretary of forests and waters
Charles A. French, commissioner of fisheries.
Philip G. Platt, Wallingford.
Marion McKay, Pittsburgh.
Frank D. McCue, Oil City.
W. L. Stevenson, chief engineer and secretary.
J. R. Hoffert, civil engineer and acting secretary.
Executive Bureau:
*Edith MacBride-Dexter, M. D., secretary of health, Harrisburg.
*Paul A. Rothfuss, M. D., deputy secretary of health, Harrisburg.
*Clinton T. Williams, comptroller, Harrisburg.
Division of accounts:
*E. J. MacNamara, Harrisburg.
Division of Supplies:
*S. J. Purvis, Harrisburg.
Division of Laboratories.
*Louis Tuft, M. D., Philadelphia.
Division of public health education:
*Howard L. Katzander, Harrisburg.
Division of dental hygiene:
*Milton Waas, D. D. S., Harrisburg.
Institutions:
Mont Alto Sanatorium:
*C. C. Custer, M. D., medical director, South Mountain
Cresson Sanatorium:
*Louis A. Wesner, M. D., medical director, Cresson.
Hamburg Sanatorium:
*H A. Gorman, M. D., medical director, Hamburg.
State Hospital for Crippled Children.
*John S. Donaldson, M. D, chief surgeon, Elizabethtown.
*Mrs. Hazel Smith, superintendent, Elizabethtown.
Bureau of health law enforcement:
*Paul A. Rothfuss, M. D.
Division of school medical inspection:
*Ted Rosenberg, Harrisburg
Division of drug control.
*Michael V. McFadden, Harrisburg.
Division of restaurant hygiene:
*Robert W. Shelton, Harrisburg.
Division of inspection
*Horace Krone, Harrisburg
Bureau of maternal and child health:
*Wayne S. Ramsey, M. D., Harrisburg.
Bureau of health conservation:
*J Moore Campbell, M. D, Harrisburg.
Division of syphilis and genitoinfectious diseases:
*Edgar S. Everhart, M D, Harrisburg.
Division of epidemiology:
*Paul A. Keeney, M D., Harrisburg.
*C. B. Mather, M D, Harrisburg.
Division of tuberculosis:
*Murray L. McElwee, M. D., Harrisburg.
*Sydney L. Feldstein, M D., Harrisburg.
Division of environmental hygiene:
*Edward Garner, Harrisburg.
*Robert Glenn, Harrisburg.
Bureau of nursing:
*Alice M. O'Halloran, R. N., Harrisburg.
Bureau of milk sanitation:
*Wilbur K. Moffett, Harrisburg.
Bureau of sanitary engineering:
*W L. Stevenson, Harrisburg
Bureau of vital statistics:
*Frank P. Strome, M. D., Harrisburg.
Appropriation for biennial period ending May 31, 1939:

Salary of secretary	$20,000
General health purposes and maintenance of sanatoria and hospital for crippled children	6,178,500
Total	6,198,500

PUBLIC HEALTH AND WELFARE SERVICE OF THE PHILIPPINES

(Under the Department of Public Instruction)

Commissioner of health and welfare:
*José Fabella, M. D., Manila.

PUERTO RICO DEPARTMENT OF HEALTH

Insular board of health:
R. López Sicardó, M. D., chairman, San Juan.
W. A. Glines, M. D., San Juan.
E. Koppisch, M. D., San Juan.
Blas C. Herrero, M. D.
D. C. Cook, expert chemist.
Etienne Totti, civil and sanitary engineer, San Juan.
A Rivera, veterinarian
Manuel del Valle, D D S
A. Ortiz Toro, attorney, San Juan.
H. A Bladuell, M D, secretary.
Executive health officer:
*E. Garrido Morales, M. D., Dr. P. H., commissioner of health, San Juan
*Antonio Arbona, M. D, assistant commissioner of health, section of public health, San Juan.
*Pedro S Malaret, M. D, assistant commissioner of health, section of charities, San Juan.
*George C. Payne, M. D., advisor, public health administration.
Division of property and accounts:
*Rafael Méndez, chief, San Juan.
Bureau of general sanitation:
*W. F Lippitt, M. D., chief, San Juan.
Bureau of sanitary engineering:
*Octavio Marcano, C E, S. E., San Juan.
Bureau of general inspection of construction and plumbing:
*José Cantellops, chief, San Juan.
Biological laboratory:
*Oscar Costa Mandry, M D., director, San Juan.
Chemical laboratory.
*R. del Valle Sárraga, Ph C, director, San Juan.
Bureau of epidemiology and vital statistics:
*Abel de Juan, M D, chief, San Juan
*S. Riera López, M D, C P H, epidemiologist, San Juan.
*J. Basora Defilló, M. D., C. P. H., epidemiologist, San Juan
*J Rodríguez Pastor, M. D., tuberculosis specialist, San Juan.
Bureau of infant hygiene:
*María Robert de Romeu, M. D., chief, San Juan
Bureau of public health units:
José Chaves, M D, chief, San Juan.
Bureau of social welfare:
*Beatriz Lassalle, superintendent, San Juan.
Appropriations for the fiscal year 1937-38.

Office of the commissioner	$139,188.17
Bureau of general sanitary inspection	53,050 00
Bureau of sanitary engineering	42,625.00
Biological laboratories	58,846.75
Chemical laboratory	21,340.00
Bureau of epidemiology and vital statistics	183,136.25
Bureau of infant hygiene	13,476.75
Bureau of public health units	454,166.75
Section of charities	778,443.70
Total	1,744,273.37

RHODE ISLAND DEPARTMENT OF PUBLIC HEALTH

Executive health officer:
*Edward A. McLaughlin, M. D., director of public health and State registrar ex-officio, State Office Building, Providence.
Bureau of preventable diseases:
*Morris L. Grover, M. D., M. P. H., epidemiologist.
*Thomas B. Casey, administrative assistant.
*Daniel L. Morrissey, M. D., assistant epidemiologist.
Bureau of maternal and child welfare:
*Francis V. Corrigan, M. D., chief.
*Edward Conaty, fiscal officer.
Bureau of crippled children:
*William A. Horan, M. D., chief.
Division of industrial hygiene:
*James P. Deery, M. D., chief.
*Charles L. Pool, engineer.

Division of laboratories:
*Edgar J. Staff, chief.
*James Dillon, sanitary engineer.
Division of vital statistics:
*Genevieve E Dolan, assistant registrar.
Division of purification of waters:
*Walter J. Shea, chief
Division of food and drugs and sanitary inspection:
*Henry J. McLaughlin, Ph. G., special agent.
Division of narcotic drugs and pharmacies·
*A. Norman LaSalle, Ph. G., LL. B., chief.
Division of examiners:
*Robert D. Wholey, chief
Division of ahtletics:
*Charles F. Reynolds, chief.
Northern district health unit:
*James P. O'Brien, M. D., district health officer.
Southern district health unit:
*Raymond F McAteer, M. D., district health officer.
Southeastern district health unit.
*Joseph Castronovo, M. D., district health officer.
State appropriations for the fiscal year ending June 30, 1938:

Administrative	$20,100
Bureau of preventable diseases	15,255
Bureau of maternal and child welfare	27,175
Bureau of crippled children	11,500
Bureau of industrial hygiene	11,500
Laboratory division·	
Pathological laboratory	29,985
Chemical laboratory	16,215
Vital statistics	11,200
Sanitary inspection	27,325
Narcotic drugs and pharmacies	10,050
Purification of waters	9,830
Food and drugs	5,720
Athletics	7,900
Examiners	12,050
Total State appropriation for department of health	215,805

Other sources of revenue:
Funds made available under provisions of the Social Security Act:

U. S. Public Health Service	$60,227
U. S. Children's Bureau	84,505

Registration fees: Chiropody, $3; chiropractic, $3; optometry, $3; dentistry, $1; funeral directors, $10; embalmers, $5; hairdressers, $2; dental hygienist, $1; barbers, $2; nurses, $0.50, midwives, $0.50.
Licenses for swimming pools:
For the entire year, $20; for any quarter thereof, $5.
Licenses for camps and bathing beaches, $10 per annum.
Fees for certified copies of birth, marriage, and death certificates, each $0.50.
Publications:
Annual health report.
Annual registration report
Weekly and monthly morbidity reports.
Monthly health revue.
Monthly vital statistics report.

SOUTH CAROLINA STATE BOARD OF HEALTH

Executive committee:
F. M. Routh, M. D., chairman, Columbia.
K. M. Lynch, M. D., Charleston.
W. R. Mead, M. D., Florence.
E. A. Hines, M. D., Seneca.
W. R. Wallace, M. D., Chester.
L. D. Boone, M. D., Aiken.
George W. Dick, D. D. S., Sumter.
D. Lesesne Smith, M. D., Spartanburg.
J. Lee Carpenter Ph. G., Greenville.
John M. Daniel, attorney general, Columbia.
A. J. Beattie, comptroller general, Columbia.
Executive health officer:
*James A. Hayne, M. D., State health officer, Columbia.
G. E. McDaniel, epidemiologist, Columbia.
Bureau of rural sanitation and county health work:
*Ben. F. Wyman, M. D., director, Columbia.
Hygienic laboratory:
*H. M. Smith, M. D., director, Columbia.
Bureau of vital statistics:
*Martin Woodward, M. D., director, Columbia.
Appropriations, July 1, 1937, to June 30, 1938:

Superintendence and control of health	$1,270
Superintendence and accounts	21,027
Bureau of rural sanitation and county health work	79,150
Bureau of vital statistics	10,580
Hygienic laboratory	12,280
Distribution of biologics	34,000
Total	158,307

SOUTH DAKOTA STATE BOARD OF HEALTH

Board of health:
N. T. Owen, M. D., president, Rapid City.
Park B. Jenkins, M. D., superintendent, Pierre.
J. B Vaughn, M. D., Castlewood.
R. J Quinn, M. D., Burke.
Executive health officer:
*Park B. Jenkins, M. D., superintendent, Pierre.
*B. A. Dyar, M. D., assistant health officer, Pierre.
*G. J. Van Heuvelen, director of crippled children, Pierre.
*R. H. Wilcox, epidemiologist, Pierre.
*Park B. Jenkins, M. D., division of vital statistics, Pierre.
*Viola Russell, M. D , director of maternal and child health, Pierre
*W W Towne, division of sanitary engineering, Pierre
*John Wiley, assistant sanitary engineer, Pierre.
*Richard Poston, assistant sanitary engineer, Pierre
B. A. Dyar, M. D., director of medical license, Pierre.
Katherine Niebuhr, division of accounts and records, Pierre.
J. C. Ohlmacher, M. D., laboratories (at Vermillion), Vermillion.

	1937-38	1938-39
Appropriations:		
Salaries and wages	$10,000	$10,000
Administrative expense to be used in connection with Federal funds	10,000	10,000
Biological products	2,000	2,000
Postage, communication, and travel	3,000	3,000
Crippled children	25,000	25,000
Dues	25	25
Infancy and maternity work	5,000	5,000
Office supplies, printing, and binding	2,000	2,000
Total	57,025	57,025

TENNESSEE DEPARTMENT OF PUBLIC HEALTH

Central administration:
*W. C. Williams, M. D., C. P. H., commissioner, Nashville.
Local health service:
*R. H. Hutcheson, M. D., C. P. H., director, Nashville.
Maternal and child hygiene:
*John M. Saunders, M. D., C. P. H., associate director, Nashville.
Public health nursing:
*Miss Frances Hagar, R. N., associate director, Nashville.
Division of vital statistics:
*W. W. Hubbard, M. D., acting director, Nashville.
Division of preventable diseases:
*C. B. Tucker, M. D., C. P. H., acting director, Nashville

Division of sanitary engineering:
*Howard D. Schmidt, C. E., acting director, Nashville.
Division of laboratories:
*W. H. Gaub, C. P. H., director, Nashville. State appropriation for year ending June 30, 1938, $375,000.
Other sources of revenue:
Rockefeller Foundation International Health Division, for year ending June 30, 1938, $27,100.
Commonwealth Fund, for year ending June 30, 1938, $37,447.
(Figures are exclusive of Federal and local appropriations.)

TEXAS STATE DEPARTMENT OF HEALTH

State board of health:
W. P. Harrison, M. D., chairman, Teague.
J. S. McCelvey, M. D., vice chairman, Temple.
S. J. Alexander, M. D., Hearne.
Henry F. Hein, Phar. D., San Antonio.
Hubert Jackson, D. D. S. San Antonio.
R. J. Rowe, M. D., Kaufman.
E. W. Wright, M. D., Bowie.

Executive officer:
*Geo. W. Cox, M. D., State health officer, Austin.
Vital statistics:
*W. A Davis, M. D., registrar.
State laboratory:
*S W. Bohls, M. D., director.
Epidemiology:
*A. M. Clarkson, M. D., director.
Maternal and child health:
*J. W E. H. Beck, M. D., director.
*J. M. Coleman, M. D., field director.
County health units:
*G W. Luckey, M. D., field director.
Industrial hygiene:
*Carl A. Nau, M. D., director.
Tuberculosis control:
*Arthur Burns, M. D., director.
Venereal disease control and mental hygiene:
*W. Arthur Smith, M. D, director.
Malaria investigation.
*C. P Coogle, M. D., director.
Dental health.
*Edward Taylor, D. D. S, director.
Sanitary engineering.
*V M. Ehlers, C. E., director.
Food and drugs:
*F. D Brock, Ph. G., director.
Public health education:
*L. E. Bracy, director.
Public relations:
*Stanford Payne, director.
Administrative assistant:
*P A Kerby.
Chief clerk and accountant:
*G N. Holton.
Appropriations (annual) for fiscal years ending August 31, 1938 and 1939:

Central administration	$219,381
District health units	97,500

UTAH STATE BOARD OF HEALTH

Board of health:
Joseph R. Morrell, M. D., president, Ogden.
J. L. Jones, M. D., secretary, Salt Lake City.
T. B. Beatty, M. D., Salt Lake City.
E. A. Tripp, D. D. S., Salt Lake City.
T. J. Howells, M. D., Salt Lake City.
R. A. Hart, C. E., Salt Lake City.
Barnet E. Bonar, M. D., Salt Lake City.
Executive health officer:
*J. L. Jones, M. D., Dr. P. H., State health commissioner, Salt Lake City.
Division of public health education:
*D. C. Houston, director, Salt Lake City.
Division of vital statistics:
*J. L. Jones, M. D., Dr. P. H., State registrar, Salt Lake City.
*Eva W. Ramsey, deputy registrar, Salt Lake City.
Division of sanitary engineering:
*Lynn M. Thatcher, director, Salt Lake City.
Bacteriological laboratory:
*E. H. Bramhall, director, Salt Lake City.
Division of epidemiology:
*Wm. M. McKay, M. D., M. P. H., director, Salt Lake City.
Venereal disease control and local health administration:
*D. D. Carr, M. D., C. P. H., director, Salt Lake City.
Division of maternal and child health:
*Mildred Nelson, M. D., director, Salt Lake City.
Division of public health nursing:
*Lily Hagerman, R. N., State advisory nurse, Salt Lake City.
Division of crippled children's service:
*Marcella McInnerny, R. N., director, Salt Lake City.
County and district health units:
*D. Keith Barnes, M. D., C. P. H., director, Davis County, Kaysville.
*Welby W Bigelow, M. D., health officer, district no. 1, Salt Lake City.
*Alton A. Jenkins, M. D., health officer, district no. 2, Cedar City.
*Edw. L Van Aelstyn, M. D., health officer, district no 3, Price
Appropriations for fiscal year ending June 30, 1937, $104,724 71.

VERMONT DEPARTMENT OF PUBLIC HEALTH

State board of health:
Charles G. Abell, M. D., chairman, Enosburg Falls.
Claude M. Campbell, M. D., Manchester Center.
Clarence H. Burr, M. D, Montpelier.
Executive health officer:
*Charles F. Dalton, M. D., secretary, State board of health, Burlington.
Laboratory of hygiene:
*Charles F. Whitney, M. D., Burlington.
Sanitary engineering:
Earle L. Waterman, C. E., director, Burlington.
Sanitary inspector:
*Fred S. Kent, M D, Burlington.
Division of communicable diseases:
*Fred S. Kent, M. D, Burlington.
Division of tuberculosis and industrial hygiene:
*Harold W. Slocum, Burlington.
Division of crippled children:
*Miss Lillian E. Kron, R. N., Burlington.
Division of public health nursing:
*Miss Nellie M Jones, R. N
Division of maternal and child health:
*Paul D Clark, M. D.
Appropriations for fiscal year ending June 30, 1938, $64,000; 1939, $64,000
Other sources of revenue: Private donations for study and treatment of infantile paralysis.
Publications issued by the department of public health:
Biennial report
Modern Health Crusader.

VIRGIN ISLANDS DEPARTMENT OF HEALTH

Executive health officer:
*Knud Knud-Hansen, M. D., commissioner of public health, Charlotte Amalie.

VIRGINIA DEPARTMENT OF HEALTH

Board of health:
W. T. Graham, M D., president, Richmond.
Mrs. Franklin H. Kenworthy, Purcellville.
Frank Darling, Hampton.
W. R. Williams, M D., Richlands.
George B. Lawson, M. D., Roanoke.
Guy R. Harrison, D. D. S., Richmond.
L. T. Royster, M. D., University.
Executive health officer:
*I. C. Riggin, M. D., State health commissioner, Richmond.
Assistant health officer:
*Roy K. Flannagan, M. D., Richmond.

Director of rural health work and tuberculosis out-patient service:
*C. H. Eller, M. D., D. P. H., Richmond.
Epidemiologist:
*G. F. McGinnes, M. D., Richmond.
Director of child health:
*B. B. Bagby, M D., Richmond.
Registrar of vital statistics:
*W. A. Plecker, M. D., Richmond.
Director of public health nursing:
*Mary I. Mastin, R. N., Richmond.
Director of mouth hygiene:
*N. T. Ballou, D. D. S., Richmond.
Acting director of laboratories:
*Adah Corpening, Richmond.
Chief sanitary engineer:
*Richard Messer, C. E., Richmond.
Director of crippled children's bureau:
*E. C. Harper, M. D.
Director of health education:
*J. C. Funk.
Director of industrial hygiene:
*W. T. Tillson, M. D.
Appropriations for the year July 1, 1937, to June 30, 1938:

Administration	$22,675
Health education	8,950
Sanitary engineering	18,870
Shellfish sanitation	15,000
Rural health	113,475
Town and camp sanitation	4,075
Tuberculosis out-patient service	45,000
Communicable diseases	16,875
Venereal disease control	1,545
Laboratories	19,200
Crippled children	36,250
Promotion of child health:	
Maternal and child health; Public health nursing; Mouth hygiene	44,100
Vital statistics	38,890
State aid to local tuberculosis sanatoria	34,000
State tuberculosis sanatoria	318,315
Total	737,220

Publications issued by health department:
Monthly bulletin.
Annual report.
Pamphlets from time to time dealing with communicable diseases, sanitation, etc.

WASHINGTON STATE DEPARTMENT OF HEALTH

Board of health:
Donald G. Evans, M. D., C. P. H., director of health, chairman, Seattle.
Ralph Hendricks, M. D., Spokane.
Alexander Peacock, M. D., Seattle.
H. E. Wight, D. D. S., Yakima.
E. N. Hutchinson, D. V. M., Olympia.
Francis D. Rhoads, secretary, Seattle.
Department of health:
Office of the director:
*Donald G. Evans, M. D., C. P. H., director of health, Seattle.
*R. H. Fletcher, M. D., assistant director, Seattle.
Division of public health nursing:
*Anna R. Moore, R. N., Seattle.
Division of health education:
*Charles Hilton, Seattle.
Division of laboratories:
*A. U. Simpson, M. D., Seattle.
Division of public health engineering:
*Roy M. Harris, C. E., Seattle.
Division of maternal and child hygiene:
*Percy F. Guy, M. D., Seattle.
Division of vital statistics:
*Francis D. Rhoads, State registrar, Seattle.
Appropriation for 2 years ending March 31, 1939:

From general fund:	
Salaries and wages	$120,000
Operations	65,407
Total	185,407

The above amount is exclusive of appropriation supplementary to grants from U. S. Public Health Service and the Children's Bureau.

WEST VIRGINIA DEPARTMENT OF HEALTH

Public health council:
Walter E. Vest, M. D., president, Huntington.
A. H. Hoge, M. D., Bluefield.
S. W. Price, M. D., Scarbro.
M. T. Morrison, M. D., Sutton.
B. H. Swint, M. D., Charleston.
W. C. D. McCuskey, M. D., Wheeling.
W. E. Minghini, D.D.S., Martinsburg.
Arthur E. McClue, M. D., ex-officio secretary.
Executive health officer:
*Arthur E. McClue, M. D., commissioner of health, Charleston.
Division of sanitary engineering:
*E. S. Tisdale, chief engineer, Charleston.
*John B. Harrington, associate engineer, Charleston.
*A. J. Kranaskas, assistant engineer, Charleston.
*Kenneth Watson, assistant engineer, Charleston.
Bureau of industrial hygiene:
*John F. Cadden, M. D., director, Charleston.
*E. T. Roetman, engineer, Charleston.
*S. C. Rothman, engineer, Charleston.
Division of vital statistics:
*Franklin H. Reeder, M. D., director, Charleston.
Division of child hygiene:
*Thomas W. Nale, M. D., acting director, Charleston.
*Laurene C. Fisher, R.N., Charleston.
Bureau of venereal diseases:
*C. N. Scott, M. D., director, Charleston.
Bureau of county health work:
*A. M. Price, M. D., director, Charleston.
*H. K. Gidley, engineer, Charleston.
Bureau of public health education:
*Dorothea Campbell, director, Charleston.
Hygienic laboratory:
*Katherine E. Cox, director, Charleston.
*Margaret K. Riffe, serologist, Charleston.
*J. Roy Monroe, bacteriologist, Charleston.
*Mark Harp, bacteriologist, Charleston.
*Mary Prince Fowler, junior serologist, Charleston.
*David Dale Johnson, junior bacteriologist, Charleston.
*Guido Innarelli, junior bacteriologist, Charleston.

Appropriation for fiscal year ending June 30, 1938:

For general use	$155,400
Compensation department	4,200
	159,600

WISCONSIN STATE BOARD OF HEALTH

Board of health:
Joseph Dean, M. D., president, Madison.
Mina B. Glasier, M. D., vice president, Bloomington.
Stephen Cahana, M. D., Milwaukee.
J. J. Seelman, M. D., Milwaukee.
Wm. W. Kelly, M. D., Green Bay.
R. L. MacCornack, M. D., Whitehall.
C. A. Harper, M. D., State health officer, Madison.
Executive health officer:
*C. A. Harper, M. D., State health officer, Madison.
Assistant State health officer:
*Carl N. Neupert, M. D., Madison.
Venereal disease control officer and supervisor of Public Health Service:
*Milton Trautmann, M. D., Madison.
Deputy State health officers:
*G. W. Henika, M. D., Madison.
*Geo. E. Hoyt, M. D., Elkhorn.
*V. A. Gudex, M. D., Fond du Lac.
*R. L. Frisbie, M. D., Rhinelander.
*F. P. Daly, M. D., Chippewa Falls.
District health officers:
*E. H. Jorris, M. D., Sparta.
*Allan Filek, M. D., Green Bay.
*John W. Lowe, M. D., Ashland.
*Leo M. Morse, M. D., Neillsville.
Bureau of vital statistics:
*C. A. Harper, M. D., State registrar, Madison.
*L. W. Hutchcroft, chief statistician, Madison.
*F. E. Kester, senior statistician, Madison.

Bureau of communicable diseases:
*H. M. Guilford, M. D., director, Madison.
*A. C. Edwards, M. D., senior epidemiologist, Madison.
Bureau of sanitary engineering:
*L. F. Warrick, State sanitary engineer, Madison.
*O. J. Muegge, assistant sanitary engineer, Madison.
*E. J. Beatty, assistant sanitary engineer, Madison.
*J. M. Holderby, assistant sanitary engineer, Madison.
*E. J. Tully, assistant chemical engineer, Madison.
*Roy F. Weston, assistant sanitary engineer, Madison (district).
*Alfred Steffen, assistant sanitary engineer, Elkhorn (district).
*Chester Obma, assistant sanitary engineer, Fond du Lac (district).
*Reginald C. Price, assistant sanitary engineer, Sparta (district).
*Gerry Halverson, assistant sanitary engineer, Neillsville (district).
*Frank J McKee, assistant sanitary engineer, Green Bay (district).
*Alfred W. West, assistant sanitary engineer, Chippewa Falls (district).
*Charles L. Senn, assistant sanitary engineer, Rhinelander (district)
*Harold Kingsbury, assistant sanitary engineer, Ashland (district)
Bureau of education:
*John Culnan, editor, Madison
*Gertrude Pankow, illustrator, Madison.
Bureau of maternal and child health:
*Amy L Hunter, M. D , chief, Madison.
*Frances A. Cline, M D , child health physician, Rhinelander
*Elizabeth Taylor, M. D , child health physician, Madison
*Ruth B Bennett, M D , child health physician, Madison
*Charlotte Fisk, M D , child health physician, Madison
*Bessie Mae Beach, M. D., child health physician, Madison.
*Evelyn B Johnson, M. D , child health physician, Madison.
*Maud Jenson, R. N., public health nurse, Madison.
*Grace M. Connors, R. N., public health nurse, Wautoma.
*Sadie Engesether, R. N., public health nurse, Frederic.
*Mildred Cook, R. N., public health nurse, Green Bay.
*Ruth B. Naset, R. N , instructor in maternity and child hygiene, Madison
*Martha Grether, R N , assistant instructor in maternity and child hygiene, Madison
*Catherine Chambers, R N., assistant instructor in maternity and child hygiene, Madison.
*Katheryn Lynch, R N., assistant instructor in maternity and child hygiene, Madison.
Bureau of public health nursing:
*Cornelia van Kooy, R N., supervisor, Madison.
*Martha R. Jenny, R. N., advisory public health nurse, Madison.
*Inga Erickson, R. N., advisory public health nurse, Madison.
*Ione M. Rowley, R. N., advisory public health nurse, Madison.
*Sophia B. Paulus, R. N., public health nurse, Madison (district).
*Vera Roswell, R. N., public health nurse, Elkhorn (district).
*Gertrude Lorber, R. N., public health nurse, Fond du Lac (district).
*Mildred Knoebel, R. N., public health nurse, Sparta (district).
*Lila J. Johnson, R. N., public health nurse, Neillsville (district).
*Margaret Brunner, R N., public health nurse, Chippewa Falls (district).
*Nellie McLaughlin, R. N., public health nurse, Indian Service, Ashland.

Bureau of nursing education:
*Barbara A. Thompson, R N., director, Madison.
*Carrie May Dokken, R. N., assistant supervisor, Madison
Bureau of plumbing and domestic sanitary engineering:
*Frank R King, State domestic sanitary engineer, Madison
*Louis T. Watry, well drilling supervisor, Madison
Bureau of social hygiene:
*H M Guilford, M. D., director, Madison.
*Aimee Zillmer, lecturer, Madison
*Dwight M Warner, lecturer, Madison
*Susan B. Mitchell, R. N., venereal clinic nurse, Madison.
*Leona Ludwig, venereal clinic nurse, Janesville.
*Irene Ryss, R N , venereal clinic nurse, Oshkosh.
*Margaret Gebhardt, R. N., venereal clinic nurse, La Crosse
*Pauline Carrington, R. N , venereal clinic nurse, Superior
*Doris Fink, R. N , venereal clinic nurse, Racine.
*Josephine Kotes, R N , venereal clinic nurse, Milwaukee.
Paul C Gatterdam, M. D., venereal clinic physician, La Crosse
Charles W. Giesen, M. D., venereal clinic physician, Superior.
C. R. Gilbertsen, M D., venereal clinic physician, Janesville
F H Frey, M. D., venereal clinic physician, Wausau
C. G Richards, M. D., venereal clinic physician, Kenosha
Joseph C. Dean, M. D., venereal clinic physician, Madison.
Earl F. Cummings, M. D , venereal clinic physician, Oshkosh
Laboratory service
*W. D Stovall, M. D., director, State laboratories, Madison.
*M. S Nichols, chemist, State laboratory, Madison
*Anna Brandsmark, director, branch laboratory, Rhinelander
*Mildred Jacobson, director, cooperative laboratory, Beloit.
*Marjorie Bates, director, cooperative laboratory, Oshkosh
*Henry Miller, director, cooperative laboratory, Kenosha
*Josephine Foote, director, cooperative laboratory, Wausau
*Martha Thompson, director, cooperative laboratory, Superior.
*Clarissa McFetridge, director, cooperative laboratory, Green Bay.
*Elizabeth Mathewson, director, cooperative laboratory, Sheboygan
Industrial hygiene:
*Paul A. Brehm, M. D , upervisor, Madison.
*Harold W Ruf, sanitary engineer, Madison.
*William Z Fluck, chemical engineer, Madison.
Appropriations for each of fiscal years ending June 30, 1938, and 1939

General administration	$155,000
Bureau of maternal and child health, and public health nursing	43,350
Enforcement of medical practices act	2,500
Specific appropriations	200,850

To each county employing a county public health health nurse, $1,000 per annum.
Licensing:
95% of the receipts, estimated at:

Embalmers	8,300
Hotels and restaurants	36,000
Barbers	21,000
Plumbers	22,400
Beauty parlors	25,400
Nurses	15,200

(NOTE.—7% of the above estimated receipts, or $8,981, to be allotted to general administration for overhead)
90% of the receipts, estimated at:

Well drillers	3,735
Estimated appropriations	132,035

Publications issued by health department:
- Quarterly bulletin.
- Biennial report.
- Other bulletins on communicable diseases.

WYOMING DEPARTMENT OF PUBLIC HEALTH

Board of health:
- Earl Whedon, M. D., president, Sheridan.
- E. W. DeKay, M. D., Laramie.
- N. E. Morad, M. D., Casper.
- J. R. Newnam, M. D., Kemmerer.

Board of health—Continued.
- G. M. Anderson, M. D., secretary and executive officer, Cheyenne.

Executive health officer:
- *G. M. Anderson, M. D., State health officer Cheyenne.

Appropriations for biennial period ending March 31, 1939:

State board of health	$11,000
Salary of secretary	8,000
Maternal and infant welfare	6,850
Bureau of vital statistics	3,880
Total	29,730

DEATHS DURING WEEK ENDED OCTOBER 23, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 23, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	8,200	8,099
Average for 3 prior years	7,833	
Total deaths, first 42 weeks of year	362,706	362,316
Deaths under 1 year of age	493	561
Average for 3 prior years	549	
Deaths under 1 year of age, first 42 weeks of year	23,318	23,424
Data from industrial insurance companies:		
Policies in force	70,003,932	68,683,645
Number of death claims	13,138	12,684
Death claims per 1,000 policies in force, annual rate	9.8	9.7
Death claims per 1,000 policies, first 42 weeks of year, annual rate	9.8	9.9

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (- --) indicate that cases or deaths may have occurred, although none was reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 30, 1937, and Oct. 31, 1936.

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct 30, 1937	Week ended Oct. 31, 1936	Week ended Oct 30, 1937	Week ended Oct 31, 1936	Week ended Oct. 30, 1937	Week ended Oct 31, 1936	Week ended Oct. 30, 1937	Week ended Oct. 31, 1936
New England States:								
Maine	1	1	-------	-------	19	13	0	1
New Hampshire	1	-------	-------	-------	40	2	0	1
Vermont	1	3	-------	-------	14	3	0	0
Massachusetts	3	2	-------	-------	28	66	2	1
Rhode Island	-------	1	-------	-------	3	27	2	0
Connecticut	2	2	4	-------	2	12	1	0
Middle Atlantic States.								
New York	30	22	[1] 7	[1] 10	86	60	7	8
New Jersey	10	8	9	12	121	25	2	4
Pennsylvania	25	36	-------	-------	287	32	2	2
East North Central States:								
Ohio	64	48	19	19	300	10	2	3
Indiana	25	31	32	28	11	4	0	5
Illinois	42	35	8	6	121	10	1	5
Michigan	31	24	1	2	24	17	1	0
Wisconsin	8	3	31	15	33	29	2	4
West North Central States:								
Minnesota	25	19	2	-------	4	16	1	0
Iowa	3	4	-------	2	3	3	1	0
Missouri	62	21	35	56	167	3	0	0
North Dakota	3	1	2	-------	-------	1	0	1
South Dakota	2	-------	-------	-------	-------	1	0	0
Nebraska	1	-------	8	1	1	3	1	0
Kansas	30	10	6	-------	10	2	0	0
South Atlantic States:								
Delaware	-------	-------	-------	4	-------	1	0	0
Maryland [2]	16	10	7	6	3	17	1	5
District of Columbia	8	9	-------	-------	1	4	1	4
Virginia	43	58	-------	-------	44	6	8	4
West Virginia	39	21	16	14	29	8	2	2
North Carolina	114	164	2	7	101	15	2	3
South Carolina [2]	29	25	229	192	8	5	1	1
Georgia [2]	42	44	-------	-------	-------	-------	1	1
Florida [2]	18	15	5	5	4	-------	1	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 30, 1937, and Oct. 31, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Oct. 30, 1937	Week ended Oct. 31, 1936	Week ended Oct. 30, 1937	Week ended Oct. 31, 1936	Week ended Oct. 30, 1937	Week ended Oct. 31, 1936	Week ended Oct. 30, 1937	Week ended Oct. 31, 1936
East South Central States:								
Kentucky	37	37	5	17	35	20	8	6
Tennessee	43	94	18	70	22	1	4	0
Alabama [3]	40	64	45	26	1	2	4	0
Mississippi [2]	17	15					0	2
West South Central States:								
Arkansas	25	12	19	48	5		1	1
Louisiana [3]	23	15	10	5	2	1	1	1
Oklahoma [4]	37	7	32	47		6	1	0
Texas [3]	39	63	134	102	8	18	1	0
Mountain States:								
Montana		2	36	4	34	1	0	1
Idaho		3	4	3	4	9	1	0
Wyoming		1			1	2	1	0
Colorado	9	6			30	1	3	1
New Mexico	2	5	2	1	24	4	1	1
Arizona	13	2		33	3	23	0	0
Utah [2]	21	1	1		34	13	0	1
Pacific States:								
Washington	3	2			9	8	0	1
Oregon	3	2	15	34	14	6	1	0
California [3]	28	49	17	26	37	24	1	2
Total	1,018	997	756	795	1,727	534	60	73
First 43 weeks of year	20,576	21,244	279,394	144,402	250,987	271,304	4,732	6,479

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever		Whooping cough
	Week ended Oct. 30, 1937	Week ended Oct. 31, 1936	Week ended Oct. 30, 1937	Week ended Oct. 31, 1936	Week ended Oct. 30, 1937	Week ended Oct. 31, 1936	Week ended Oct. 30, 1937	Week ended Oct. 31, 1936	Week ended Oct. 30, 1937
New England States:									
Maine	2	2	10	2	0	0	4	1	16
New Hampshire	0	0	2	3	0	0	0	0	12
Vermont	0	0	11	4	0	0	2	1	8
Massachusetts	2	3	109	103	0	0	2	0	89
Rhode Island	0	0	10	12	0	0	1	0	17
Connecticut	5	0	35	33	0	0	2	0	15
Middle Atlantic States:									
New York	14	6	188	238	0	0	11	22	307
New Jersey	4	0	62	37	0	0	4	2	71
Pennsylvania	8	9	177	230	0	0	20	35	
East North Central States:									
Ohio	7	22	251	226	1	0	13	21	100
Indiana	4	4	125	88	3	1	2	2	27
Illinois	16	39	273	243	3	1	18	27	83
Michigan	9	13	308	187	0	0	7	5	179
Wisconsin	11	3	95	163	0	6	0	5	240
West North Central States:									
Minnesota	12	0	78	95	2	4	3	0	45
Iowa	3	6	101	70	8	10	3	1	
Missouri	11	2	181	77	10	1	24	14	78
North Dakota	0	1	45	33	21	15	0	5	41
South Dakota	2	0		39	0	7	1	0	38
Nebraska	1	0	12	17	0	4	0	0	23
Kansas	3	8	91	99	1	0	3	2	68
South Atlantic States:									
Delaware	0	0	8	4	0	0	0	3	9
Maryland [3]	1	2	37	51	0	0	4	8	70
District of Columbia	1	0	14	15	0	0	1	0	5
Virginia	2	2	65	36	0	0	3	13	54
West Virginia	1	2	110	79	0	0	11	25	26

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Oct. 30, 1937, and Oct. 31, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid fever		Whooping cough
	Week ended Oct. 30, 1937	Week ended Oct 31, 1936	Week ended Oct 30, 1937	Week ended Oct 31, 1936	Week ended Oct 30, 1937	Week ended Oct 31, 1936	Week ended Oct 30, 1937	Week ended Oct 31, 1936	Week ended Oct 30, 1937
North Carolina	2	1	63	83	0	0	9	8	104
South Carolina [3]	0	0	10	7	0	0	5	8	25
Georgia [3]	1	5	33	17	0	0	8	28	5
Florida [3]	0	1	7	6	0	0	3	0	
East South Central States:									
Kentucky	0	2	81	82	25	0	7	40	81
Tennessee	7	23	44	46	0	1	19	9	19
Alabama [3]	3	10	19	23	0	1	2	13	14
Mississippi [2]	5	2	17	12	0	0	9	8	
West South Central States:									
Arkansas	7	4	25	11	1	0	16	9	20
Louisiana [3]	3	0	18	7	0	0	12	11	2
Oklahoma [4]	3	6	52	22	0	2	21	7	28
Texas [3]	4	6	56	41	1	0	38	23	
Mountain States:									
Montana	1	0	14	33	10	7	3	4	13
Idaho	0	0	18	29	11	0	3	2	3
Wyoming	0	0	9	9	0	0	0	0	16
Colorado	2	1	26	17	3	0	5	4	4
New Mexico	0	3	34	17	0	0	11	11	28
Arizona	0	0	3	8	0	0	3	0	12
Utah [2]	2	0	35	19	3	1	2	0	17
Pacific States:									
Washington	4	1	22	40	8	3	3	2	61
Oregon	1	2	17	27	4	1	2	4	18
California [3]	14	4	152	176	1	0	5	5	216
Total	178	195	3,151	2,916	116	65	325	388	2,302
First 43 weeks of year	8,853	3,729	183,639	195,578	8,662	6,327	13,291	12,592	

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Oct 30, 1937, 47 cases, as follows South Carolina, 1, Georgia, 22 Florida, 3 Alabama, 12, Louisiana, 1, Texas, 7 California, 1.
[4] Figures for 1936 are exclusive of Oklahoma City and Tulsa

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September 1937										
Arkansas	1	63	59	766	8	13	39	34	1	60
California	13	102	68	42	115	7	194	422	14	101
Hawaii Territory	0	14	2,607		81		1		[1]1	10
Mississippi	2	81	1,060	6,521	320	312	29	43	0	39
Montana	1	5	7		29		13	68	22	12
Oregon	2	6	38	10	15		11	41	10	11
Texas	12	137	310	2,196	100	134	106	95	2	233
Washington	1	6	12		47		27	60	66	15

[1] On vessel.

September 1937

	Cases
Actinomycosis:	
Montana	1
Anthrax:	
California	1
Botulism:	
California	2
Chickenpox:	
Arkansas	3
California	338
Hawaii Territory	23
Mississippi	178
Montana	34
Oregon	47
Texas	58
Washington	67
Conjunctivitis:	
Hawaii Territory	3
Washington	1
Dengue:	
Mississippi	4
Texas	10
Dysentery:	
Arkansas (amoebic)	7
California (amoebic)	13
California (bacillary)	67
Hawaii Territory (bacillary)	1
Mississippi (amoebic)	88
Mississippi (bacillary)	458
Texas (bacillary)	182
Washington (bacillary)	2
Encephalitis, epidemic or lethargic:	
California	27
Montana	7
Oregon	1
Washington	2
Food poisoning:	
California	52
German measles:	
California	74
Montana	3
Washington	4
Granuloma, coccidioidal:	
California	1

September 1937—Continued

	Cases
Hookworm disease:	
Hawaii Territory	5
Mississippi	372
Impetigo contagiosa:	
Hawaii Territory	33
Montana	5
Oregon	62
Washington	4
Jaundice, epidemic:	
California	4
Hawaii Territory	6
Oregon	1
Leprosy.	
California	2
Hawaii Territory	3
Mumps:	
Arkansas	7
California	532
Hawaii Territory	52
Mississippi	98
Montana	40
Oregon	11
Texas	84
Washington	128
Opthalmia neonatorum:	
Arkansas	2
California	1
Mississippi	9
Paratyphoid fever:	
California	7
Texas	12
Washington	1
Plague:	
California (delayed report)	1
Puerperal septicemia	
Mississippi	27
Rabies in animals:	
California	170
Texas	1
Washington	15
Relapsing fever:	
California	5
Rocky Mountain spotted fever:	
California	1

September 1937—Continued

	Cases
Scabies:	
Montana	1
Oregon	78
Septic sore throat:	
Arkansas	6
California	7
Hawaii Territory	1
Montana	7
Oregon	3
Washington	3
Tetanus	
California	10
Washington	2
Trachoma:	
Arkansas	3
California	51
Hawaii Territory	41
Montana	1
Oregon	2
Trichinosis:	
California	6
Tularaemia	
Arkansas	1
California	4
Texas	5
Typhus fever:	
California	3
Hawaii Territory	4
Texas	57
Undulant fever:	
Arkansas	3
California	32
Mississippi	1
Montana	3
Texas	20
Washington	3
Vincent's infection.	
Montana	1
Oregon	12
Whooping cough:	
Arkansas	51
California	1,215
Hawaii Territory	26
Mississippi	386
Montana	114
Oregon	61
Texas	472
Washington	201

PLAGUE INFECTION IN CALIFORNIA

Under date of October 25, 1937, Dr. W. M. Dickie, Director of Public Health of California, reported plague infection proved by animal inoculation in organs from a flying squirrel, *Glaucomys sabrinus lascivus* Bangs, and in a pool of organs from 2 white footed mice, all collected October 9 at Billy Creek Public Camp, 3 miles west of Lake Shore Resort, Huntington Lake, Fresno County, Calif.; in a pool of organs from 10 golden mantled squirrels from the Billy Creek area, 5 golden mantled squirrels from the Huntington Lodge area, and 9 golden mantled squirrels from the Cedar Crest area, Fresno County, received October 4; and in a pool of organs from 10 California chickaree squirrels (*Sciurus douglasii albolimatus* Allen) collected in the Tahoe area, Placer County, Calif.

WEEKLY REPORTS FROM CITIES

City reports for week ended Oct. 23, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	280	129	27	180	441	843	6	352	64	773	--------
Current week	133	98	31	351	501	710	17	327	41	710	--------
Maine:											
Portland	0	------	0	0	4	0	0	0	0	2	31
New Hampshire:											
Concord	0	------	0	2	2	0	0	0	0	3	10
Manchester	0	------	0	0	1	1	0	1	0	0	29
Nashua	0	------	0	0	0	1	0	0	0	0	5
Vermont											
Barre	0	------	0	6	0	0	0	0	0	0	1
Burlington	0	------	0	0	0	2	0	0	0	0	7
Rutland	0	------	0	1	0	0	0	0	0	1	5
Massachusetts.											
Boston	0	------	0	8	22	29	0	13	0	13	198
Fall River	0	------	0	0	1	3	0	4	0	19	48
Springfield	0	------	0	0	1	2	0	1	1	5	37
Worcester	0	------	0	1	7	0	0	2	1	2	55
Rhode Island											
Pawtucket	0	------	0	0	0	1	0	0	0	0	12
Providence	0	------	0	0	2	7	0	2	0	21	70
Connecticut											
Bridgeport	1	------	0	0	3	7	0	2	0	1	33
Hartford	1	------	0	1	0	1	0	0	0	6	38
New Haven	0	------	0	0	1	2	0	1	0	1	46
New York.											
Buffalo	1	------	1	1	0	22	0	1	0	12	136
New York	26	12	4	19	89	65	0	59	8	98	1,416
Rochester	0	------	0	0	1	1	0	2	0	1	67
Syracuse	0	------	0	0	6	10	0	0	0	5	50
New Jersey											
Camden	0	1	0	0	2	1	0	0	1	0	23
Newark	0	1	1	0	6	3	0	9	0	8	95
Trenton	0	------	1	31	1	0	0	4	0	0	41
Pennsylvania											
Philadelphia	3	3	3	3	26	35	0	22	3	27	493
Pittsburgh	1	1	1	77	25	31	0	6	1	18	187
Reading	1	------	0	1	3	4	0	1	0	1	20
Scranton	0	------	--------	8	------	0	0	------	0	5	--------
Ohio:											
Cincinnati	4	------	0	0	6	8	0	5	0	5	128
Cleveland	2	8	1	27	9	25	0	11	0	15	195
Columbus	3	1	1	1	7	9	0	3	0	1	80
Toledo	1	1	1	0	2	5	0	3	0	2	62
Indiana:											
Anderson	0	------	0	1	1	6	0	0	0	5	9
Fort Wayne	1	------	0	0	3	2	0	1	0	0	28
Indianapolis	8	------	1	1	8	13	0	4	1	7	109
Muncie	0	------	0	0	1	0	0	0	0	0	14
South Bend	0	------	0	1	0	0	0	0	0	2	15
Terre Haute	0	------	0	0	0	1	0	0	0	0	19
Illinois:											
Alton	0	------	0	12	0	4	0	0	0	0	12
Chicago	10	7	0	22	30	83	0	39	3	41	673
Elgin	0	------	0	0	0	2	0	1	0	0	10
Moline	0	------	0	0	0	1	0	0	0	2	9
Springfield	1	------	0	0	2	4	0	0	2	0	17
Michigan:											
Detroit	11	1	1	26	27	60	0	15	3	53	265
Flint	3	3	0	1	3	11	0	0	0	11	28
Grand Rapids	0	------	0	1	2	19	0	0	0	16	43
Wisconsin:											
Kenosha	0	------	0	0	0	3	0	0	0	3	7
Madison	0	------	0	2	0	1	0	2	0	6	24
Milwaukee	1	------	0	9	7	9	0	5	0	45	117
Racine	0	------	0	0	0	5	0	0	0	4	8
Superior	2	------	0	0	0	0	0	0	0	0	11
Minnesota:											
Duluth	0	------	0	0	1	3	0	1	0	7	21
Minneapolis	1	------	1	2	4	22	0	1	0	16	90
St. Paul	1	------	0	1	5	2	0	2	0	9	55

City reports for week ended Oct. 23, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Iowa:											
Cedar Rapids	0	------	------	0	------	0	0	------	0	0	------
Davenport	0	------	------	0	------	0	0	------	0	0	------
Des Moines	0	------	------	0	------	14	0	------	0	0	29
Sioux City	0	------	------	1	------	3	0	------	0	0	------
Waterloo	0	------	------	0	------	4	0	------	0	0	------
Missouri:											
Kansas City	0	------	0	0	2	15	0	4	0	1	115
St. Joseph	0	------	0	0	3	1	0	1	0	0	28
St. Louis	9	------	2	66	9	35	1	4	1	5	190
North Dakota:											
Fargo	0	------	0	0	------	2	0	------	0	6	------
Grand Forks	0	------	------	0	------	11	0	------	0	4	------
Minot	0	------	0	0	0	1	0	0	0	0	2
South Dakota:											
Aberdeen	0	------	------	0	------	0	0	------	0	1	------
Sioux Falls	0	------	------	0	------	0	0	------	0	0	8
Nebraska:											
Omaha	2	------	0	0	2	3	0	2	0	0	46
Kansas:											
Lawrence	0	------	0	0	1	0	0	0	0	0	7
Topeka	0	------	1	0	2	1	0	0	0	1	14
Wichita	0	------	0	0	0	4	0	2	0	6	28
Delaware:											
Wilmington	2	------	0	0	2	0	0	1	0	5	26
Maryland:											
Baltimore	2	9	1	3	28	12	0	14	1	44	234
Cumberland	0	------	0	0	2	0	0	0	0	4	16
Frederick	0	------	0	0	0	0	0	0	0	0	2
Dist. of Col.:											
Washington	5	2	1	3	16	5	0	6	3	6	165
Virginia:											
Lynchburg	0	------	0	0	0	1	0	0	0	1	7
Norfolk	0	------	0	0	0	2	0	4	0	0	32
Richmond	1	------	0	1	4	3	0	2	0	1	60
Roanoke	1	------	0	0	5	0	0	1	1	1	26
West Virginia:											
Charleston	1	1	0	0	1	2	0	0	0	0	23
Huntington	1	0	------	3	------	3	0	------	0	0	------
Wheeling	0	------	1	1	0	6	0	0	0	7	7
North Carolina:											
Gastonia	5	------	------	0	------	0	0	------	0	0	------
Raleigh	1	------	0	0	4	0	0	0	0	8	21
Wilmington	0	------	0	0	0	0	0	0	0	7	16
Winston-Salem	0	------	0	0	1	1	0	0	1	1	13
South Carolina:											
Charleston	0	------	0	0	3	3	0	0	2	0	27
Columbia	0	------	0	0	2	0	0	0	0	0	10
Florence	0	------	0	0	0	0	0	0	0	0	9
Greenville	0	------	0	0	2	1	0	0	0	0	11
Georgia:											
Atlanta	2	10	1	1	11	11	0	4	1	1	72
Brunswick	0	------	0	0	1	0	0	1	0	0	4
Savannah	3	23	1	0	1	0	0	1	0	1	31
Florida:											
Miami	0	------	0	1	3	0	0	0	0	0	32
Tampa	0	1	1	0	2	0	0	0	0	0	19
Kentucky:											
Ashland	3	------	0	0	0	1	0	0	0	0	1
Covington	0	------	0	0	3	1	0	0	0	0	14
Lexington	0	------	0	2	3	2	0	2	0	6	18
Louisville	0	------	0	0	12	14	0	4	0	12	83
Tennessee:											
Knoxville	3	------	0	1	2	5	0	0	0	0	29
Memphis	1	------	0	1	3	5	0	2	1	1	75
Nashville	1	------	------	------	8	3	0	2	0	3	50
Alabama:											
Birmingham	0	------	0	0	3	3	0	3	0	0	70
Mobile	1	------	2	6	1	0	0	0	0	0	23
Montgomery	4	------	------	0	------	1	0	------	0	1	------
Arkansas:											
Fort Smith	1	------	------	0	------	6	0	------	0	5	------
Little Rock	0	------	0	2	3	3	0	5	1	0	12
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	0	0	0	4
New Orleans	2	5	0	0	12	2	0	15	2	0	131
Shreveport	1	------	0	0	4	1	0	1	0	0	38
Oklahoma:											
Oklahoma City	0	------	1	0	7	4	0	0	2	0	45
Tulsa	1	------	------	0	------	10	0	------	0	5	------

City reports for week ended Oct. 23, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Texas:											
Dallas	5	------	0	0	1	10	0	2	0	2	52
Fort Worth	1	------	1	0	1	4	0	0	0	1	39
Galveston	0	------	0	0	2	2	0	1	0	0	13
Houston	1	------	0	0	1	2	0	3	0	0	55
San Antonio	0	------	1	0	2	0	0	4	0	0	53
Montana:											
Billings	0	------	0	0	1	0	0	0	0	0	11
Great Falls	0	------	0	1	1	2	0	0	0	0	5
Helena	0	------	0	0	0	0	0	0	0	3	4
Missoula	0	------	0	0	0	0	0	0	0	0	5
Idaho:											
Boise	0	------	0	0	2	2	0	0	0	0	10
Colorado:											
Colorado Springs	0	------	0	0	0	2	0	0	0	0	4
Denver	3	------	0	11	4	6	0	2	0	5	64
Pueblo	1	------	0	0	1	3	0	1	0	0	15
New Mexico											
Albuquerque	0	------	0	4	0	2	0	1	0	2	15
Utah:											
Salt Lake City	0	------	0	1	1	6	0	2	0	6	36
Washington:											
Seattle	0	------	0	2	7	2	1	4	0	20	98
Spokane	0	1	1	0	6	1	0	4	0	2	42
Tacoma	0	------	0	0	2	3	15	1	0	4	29
Oregon											
Portland	0	------	0	2	1	2	0	0	1	0	69
Salem	0	------	--------	0	-------	0	0	-------	1	1	--------
California											
Los Angeles	9	2	1	6	12	41	0	13	2	28	311
Sacramento	2	1	1	0	3	3	0	1	1	16	33
San Francisco	0	5	0	4	6	3	0	2	0	36	165

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	1	0	3
New York:			
Buffalo	1	1	0
New York	7	3	8
Syracuse	0	0	2
New Jersey:			
Camden	0	0	1
Pennsylvania:			
Philadelphia	0	0	1
Pittsburgh	0	1	0
Ohio:			
Cincinnati	3	1	0
Cleveland	0	0	2
Columbus	1	0	0
Illinois:			
Chicago	2	0	5
Michigan:			
Detroit	0	0	2
Grand Rapids	0	0	2
Wisconsin:			
Milwaukee	0	0	2
Racine	0	0	1
Minnesota:			
Minneapolis	0	0	5
St. Paul	0	0	4
Iowa:			
Des Moines	0	0	1
Missouri:			
Kansas City	0	0	1
St. Joseph	0	0	2
St. Louis	1	1	1
North Dakota:			
Fargo	0	0	1
Nebraska			
Omaha	0	0	2
Kansas.			
Wichita	0	0	2
Maryland			
Baltimore	2	0	0
District of Columbia:			
Washington	3	0	1
South Carolina			
Charleston	1	0	0
Kentucky.			
Louisville	1	0	0
Tennessee			
Knoxville	0	1	0
Memphis	0	0	1
Alabama			
Mobile	0	0	1
Louisiana			
New Orleans	0	0	3
Shreveport	0	2	0
Oklahoma:			
Oklahoma City	1	0	1
Colorado			
Denver	1	0	0
New Mexico:			
Albuquerque	1	0	0
Washington.			
Seattle	0	0	1
Oregon:			
Portland	0	0	1
California.			
Sacramento	1	1	1
San Francisco	1	0	2

Encephalitis, epidemic or lethargic.—Cases. New York, 2; Des Moines, 1; St. Louis, 9.

Pellagra.—Cases: Charleston, S. C., 2; Atlanta, 4; Savannah, 1; Knoxville, 1; Los Angeles, 1; San Francisco, 1.

Typhus fever.—Cases: Baltimore, 1; Charleston, S. C., 1; Atlanta, 1; Lexington, 1; Mobile, 2.

FOREIGN AND INSULAR

CUBA

Provinces—Notifiable diseases—4 weeks ended October 16, 1937.—During the 4 weeks ended October 16, 1937, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer				5	1	1	7
Chicken pox	1				1	1	3
Diphtheria	2	28	3	3	2	1	39
Dysentery (bacillary)		1					1
Leprosy		5				1	6
Malaria	128	106	87	93	17	148	579
Measles		3	2	1		1	7
Poliomyelitis			1			1	2
Scarlet fever			1				1
Tuberculosis	9	15	33	43	77	29	206
Typhoid fever	30	63	18	35	13	22	181
Undulant fever		1					1
Yaws						18	18

FINLAND

Communicable diseases—September 1937.—During the month of September 1937, cases of certain communicable diseases were reported in Finland as follows:

Disease	Cases	Disease	Cases
Diphtheria	440	Poliomyelitis	49
Dysentery	4	Scarlet fever	454
Influenza	1,302	Typhoid fever	66
Paratyphoid fever	159	Undulant fever	4

ITALY

Communicable diseases—4 weeks ended August 15, 1937.—During the 4 weeks ended August 15, 1937, cases of certain communicable diseases were reported in Italy as follows:

Disease	July 19-25		July 26-Aug. 1		Aug 2-8		Aug. 9-15	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	29	24	45	36	40	32	26	23
Cerebrospinal meningitis	16	15	10	10	14	13	22	18
Chicken pox	151	86	127	81	109	71	67	47
Diphtheria	372	198	374	190	368	210	433	242
Dysentery	115	47	103	43	109	43	111	53
Hookworm disease	25	10	16	10	26	12	13	8
Lethargic encephalitis	1	1			1	1	1	1
Measles	787	257	651	244	640	252	485	187
Mumps	190	88	161	71	159	74	149	68
Paratyphoid fever	200	133	179	124	249	141	287	146
Poliomyelitis	121	87	93	69	68	53	80	59
Puerperal fever	29	28	32	30	16	16	28	25
Rabies					1	1		
Scarlet fever	218	113	203	99	193	119	170	97
Typhoid fever	1,022	506	1,071	545	1,155	590	1,387	634
Undulant fever	88	73	98	76	87	69	67	53
Whooping cough	597	223	597	215	590	198	497	161

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for October 29, 1937, pages 1547-1562. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued November 26, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

China.—During the week ended October 23, 1937, cholera was reported in China as follows: Hong Kong, 14 cases; Kwangchow Wan, 6 cases; Shanghai, 110 cases.

French Indochina.—During the week ended October 23, 1937, cholera was reported in French Indochina as follows: Annam, 1 case; Haiphong, 68 cases; Hanoi, 86 cases; Tonkin Province, 759 cases.

Plague

Peru.—During the month of September 1937, plague was reported in Peru as follows: Lambayeque Department, 2 cases, 1 death; Lima Department, 3 cases, 2 deaths.

United States—California.—A report of plague in California appears on page 1632 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

Bolivia—La Paz.—According to press reports of La Paz, Bolivia, there is an epidemic of smallpox in that city, 30 cases having been reported up to September 16, 1937. General vaccination of the population has been ordered.

Yellow Fever

Brazil—Para State—Itaguary.—On September 15, 1937, 1 death from yellow fever was reported in Itaguary, Para State, Brazil.

Colombia.—Yellow fever has been reported in Colombia as follows: Medina, Cundinamarca Department, 1 death on September 18; Velez, Santander Department, 1 death on September 26; Villavicencio, Intendencia of Meta, 1 death on September 25.

Gold Coast—Mamidede.—On October 20, 1937, 1 case of yellow fever was reported in Mamidede, Gold Coast.

Nigeria—Shendam.—On September 23, 1937, 1 case of yellow fever was reported in Shendam, Nigeria.

Senegal.—Yellow fever has been reported in Senegal as follows: October 27, 1 suspected case in Kaolakh; October 24, 1 case in Thies and October 27, 1 case in the same locality.

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS is published primarily for distribution, in accordance with the law, to health officers, members of boards or departments of health, and other persons directly or indirectly engaged in public health work. Articles of special interest are issued as reprints or as supplements, in which forms they are made available for more economical and general distribution.

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PUBLIC HEALTH REPORTS

VOL. 52 NOVEMBER 19, 1937 NO. 47

EXTENT OF RURAL HEALTH SERVICE IN THE UNITED STATES, DECEMBER 31, 1932, TO DECEMBER 31, 1936

INTRODUCTION

In presenting statistics with respect to the extent of rural health service in the United States it is deemed necessary to define what should be included under this classification. Every State provides some form of health service to its rural population, fragmentary though it may be. It is almost universally found that the State and local laws provide for local—township, village, or county—part-time health officers, and prescribe rules for the theoretical protection of public health. Though such provisions might be claimed as evidence of health service to local communities, they cannot, in the light of our modern knowledge of the causes of disease and methods of control, be credited as having any considerable value as instruments of disease prevention and health conservation.

The type of State health organization is also responsible for differences of interpretation as to the meaning of the term "rural health service." In certain States where the township has been the dominating factor in local government, the tendency has been to centralize authority and responsibility for health administration in the State health organization, since the township is too small a unit of local government to maintain a modern local health service. In those States, however, where county government is strong, it has been found logical and practicable to decentralize the administration of health service by building up within the counties health units having charge of and capable of handling all phases of local health work. In the former group of States it may be held that health service to local communities is furnished from the central organization. To a certain extent this is true. It is, however, believed to be self-evident that the closer the system of health administration comes to the people who are to receive it, the more effective the service is calculated to be. For this reason the type of organization which has become recognized as the minimum standard capable of furnishing a complete health service to local communities is the so-called health unit, consisting of a medical director, public health nurse, sanitary engineer or sanitarian, and an office clerk, all of whom are technically trained in their respective fields of duty and devote their full time to this work.

Ordinarily the smallest governmental unit suitable for the development of a health unit is a county or city. It is well known, however, that a health unit confined to one county is beyond the reach of a large number of the counties in the United States. It is therefore generally conceded that if health service is ever to be made available to all local communities, as it should be, the only alternative is to group those counties which are unable to maintain separate health units into districts of two or more counties each, under the supervision of whole-time unit personnel consisting of a medical director having jurisdiction over the entire district and at least one nurse and one sanitarian for each component county. This type of local health organization has been developed extensively during the past year, and in future years will probably become the commonest type of local health unit. In the report which follows, local health service is listed by counties, without reference to districts. Where district organization exists the counties composing the district are listed separately, with appropriate notations to show that the county belongs to a district group.

It will be noted that this report pertains to rural health service. The Census Bureau classifies population groups of 2,500 or less as rural. It is not to be understood that this report excludes towns and cities whose population is over 2,500. The application of the term "rural" in this report is to distinguish from "municipal." Many of the county health units serve one or more municipalities within their borders, yet they are reported as rural health services since the municipality is only a component part of the county, and the controlling interest is, in most instances, vested in the county.

With the foregoing explanations in mind, it is believed that the information set forth in the succeeding tables will be more intelligible.

ALABAMA

Of the 67 counties in Alabama, 57 are now organized on a whole-time county health unit basis. By comparing the list of 1935 with that of 1936 it will be found that one county, Autauga, is missing from the 1936 list, whereas two counties, Butler and Henry, have been added, making a net gain of one county for the year. Alabama represents an outstanding example of organization on a county basis, there being no district health units in the State.

The lists following the text statements for each State show the counties, townships, or districts in the United States in which rural sections were provided with health service under whole-time health officers each year from 1932 to 1936, as of December 31.

1932	1933	1934	1935	1936
Baldwin	Barbour	Autauga	Autauga	Baldwin
Barbour	Blount	Barbour	Baldwin	Barbour
Blount	Bullock	Blount	Barbour	Blount
Bullock	Calhoun	Bullock	Blount	Bullock
Calhoun	Chambers	Calhoun	Bullock	Butler
Chambers	Cherokee	Chambers	Calhoun	Calhoun
Cherokee	Cleburne	Cherokee	Chambers	Chambers
Choctaw	Conecuh	Cleburne	Cherokee	Cherokee
Clarke	Covington	Colbert	Chilton	Chilton
Cleburne	Crenshaw	Conecuh	Cleburne	Cleburne
Coffee	Cullman	Covington	Coffee	Coffee
Colbert	Dale	Crenshaw	Colbert	Colbert
Conecuh	Dallas	Cullman	Conecuh	Conecuh
Covington	De Kalb	Dale	Coosa	Coosa
Crenshaw	Elmore	Dallas	Covington	Covington
Cullman	Escambia	Elmore	Crenshaw	Crenshaw
Dale	Etowah	Escambia	Cullman	Cullman
Dallas	Franklin	Etowah	Dale	Dale
De Kalb	Geneva	Franklin	Dallas	Dallas
Elmore	Houston	Houston	De Kalb	De Kalb
Escambia	Jackson	Jackson	Elmore	Elmore
Etowah	Jefferson	Jefferson	Escambia	Escambia
Franklin	Lauderdale	Lamar	Etowah	Etowah
Geneva	Lawrence	Lauderdale	Franklin	Franklin
Houston	Lee	Lawrence	Houston	Henry
Jackson	Limestone	Lee	Jackson	Houston
Jefferson	Macon	Limestone	Jefferson	Jackson
Lamar	Madison	Lowndes	Lamar	Jefferson
Lauderdale	Marengo	Macon	Lauderdale	Lamar
Lawrence	Marion	Madison	Lawrence	Lauderdale
Lee	Marshall	Marengo	Lee	Lawrence
Limestone	Mobile	Marion	Limestone	Lee
Lowndes	Monroe	Marshall	Lowndes	Limestone
Macon	Montgomery	Mobile	Macon	Lowndes
Madison	Morgan	Monroe	Madison	Macon
Marengo	Perry	Montgomery	Marengo	Madison
Marion	Pickens	Morgan	Marion	Marengo
Marshall	Pike	Perry	Marshall	Marion
Mobile	Shelby	Pickens	Mobile	Marshall
Monroe	Sumter	Pike	Monroe	Mobile
Montgomery	Talladega	Russell	Montgomery	Monroe
Morgan	Tallapoosa	Shelby	Morgan	Montgomery
Perry	Tuscaloosa	Sumter	Perry	Morgan
Pickens	Walker	Talladega	Pickens	Perry
Pike	Washington	Tallapoosa	Pike	Pickens
Shelby	Wilcox	Tuscaloosa	Randolph	Pike
Sumter		Walker	Russell	Randolph
Talladega		Washington	Shelby	Russell
Tallapoosa		Wilcox	Sumter	Shelby
Tuscaloosa		Winston	Talladega	Sumter
Walker			Tallapoosa	Talladega
Washington			Tuscaloosa	Tallapoosa
Wilcox			Walker	Tuscaloosa
Winston			Washington	Walker
			Wilcox	Washington
			Winston	Wilcox
				Winston

ARIZONA

Arizona contains a total of 14 counties, 5 of which are now under whole-time county health administration as compared with 4 in 1935. The same counties as were in operation in 1935 were continued in 1936, with the addition of Yuma. While the number of counties is only slightly over a third of the entire number in the State it should be noted that counties having whole-time health units comprise the larger population centers and consequently serve a much larger proportion of the entire population of the State.

1932	1933	1934	1935	1936
Cochise	Cochise	Cochise	Cochise	Cochise
Gila	Gila	Gila	Gila	Gila
Maricopa	Maricopa	Maricopa	Maricopa	Maricopa
Pima	Pima	Pima	Pima	Pima
				Yuma

ARKANSAS

In 1935 there were 19 counties in Arkansas under whole-time health administration, 16 of which had individual county health units, while 3 were included in a district organization. The list for 1936 shows a total of 39 counties, which is more than half of the 75 counties in the State and more than double the number reported for 1935. It will be noted, however, that the very great increase has been effected through the organization of district health units comprising two to four counties each.

1932	1933	1934	1935	1936
Arkansas[1]	Ashley	Ashley	Ashley	Arkansas[1]
Ashley	Clark	Clark	Benton[2]	Ashley[2]
Bradley	Conway	Conway	Clark	Benton[2]
Chicot	Crittenden	Crittenden	Crawford[2]	Calhoun[3]
Clark	Cross	Cross	Crittenden	Chicot[2]
Cleveland	Faulkner	Garland	Garland	Clark[3]
Conway	Garland	Jackson	Jackson	Cleburne[1]
Crittenden	Jackson	Jefferson	Jefferson	Conway
Cross	Jefferson	Little River	Little River	Crawford[2]
Drew	Little River	Mississippi	Mississippi	Crittenden
Garland	Lonoke	Monroe	Ouachita	Cross[3]
Jackson	Mississippi	Ouachita	Phillips	Dallas[3]
Jefferson	Monroe	Phillips	Pope	Drew[2]
Lincoln	Ouachita	Pope	Pulaski	Faulkner[1]
Little River	Phillips	Pulaski	Saline	Garland
Lonoke	Pope	Saline	Sebastian	Grant[3]
Mississippi	Pulaski	Sebastian	Washington[2]	Hempstead[3]
Monroe	Saline	Woodruff	Woodruff	Hot Spring[3]
Ouachita	Sebastian	Yell	Yell	Howard[3]
Phillips	Woodruff			Jackson[3]
Pope	Yell			Jefferson
Prairie[1]				Johnson[2]
Pulaski				Lee[1]
Saline				Little River[3]
Sebastian				Mississippi
Woodruff				Monroe[1]
Yell				Nevada[3]
				Ouachita[3]
				Phillips[1]
				Pope[1]
				Pulaski
				St. Francis
				Saline[3]
				Sebastian
				Sevier[3]
				Washington[2]
				White[3]
				Woodruff[3]
				Yell[2]

[1] Included in a district of 2 counties.
[2] Included in a district of 3 counties.
[3] Included in a district of 4 counties.

CALIFORNIA

Out of 58 counties in the State of California, 16 are under whole-time health administration, all of which are served by individual county units. The same counties as appear in the list for 1935 are reported for 1936, none having been added and none lost. As in the case of Arizona, the comparatively small number of counties is a bit misleading, since the largest concentration of population is found in those counties having whole-time health units.

1932	1933	1934	1935	1936
Contra Costa	Contra Costa	Alameda	Alameda	Alameda
Imperial	Imperial	Contra Costa	Contra Costa	Contra Costa
Los Angeles	Los Angeles	Imperial	Fresno	Fresno
Madera	Madera	Los Angeles	Imperial	Imperial
Monterey	Monterey	Madera	Los Angeles	Los Angeles
Orange	Orange	Monterey	Madera	Madera
Riverside	Riverside	Orange	Monterey	Monterey
San Bernardino	San Bernardino	Riverside	Orange	Orange
San Diego	San Diego	San Bernardino	Riverside	Riverside
San Joaquin	San Joaquin	San Diego	San Bernardino	San Bernardino
San Luis Obispo	San Luis Obispo	San Joaquin	San Diego	San Diego
Santa Barbara	Santa Barbara	San Luis Obispo	San Joaquin	San Joaquin
Stanislaus	Stanislaus	San Mateo	San Luis Obispo	San Luis Obispo
Yolo		Santa Barbara	San Mateo	San Mateo
		Stanislaus	Santa Barbara	Santa Barbara
			Stanislaus	Stanislaus

DELAWARE

Since 1927, Delaware has been reported as having all of its counties under whole-time health administration. Delaware has the distinction of being the first State to achieve 100-percent organization on a whole-time county basis.

1932	1933	1934	1935	1936
Kent	Kent	Kent	Kent	Kent
New Castle	New Castle	New Castle	New Castle	New Castle
Sussex	Sussex	Sussex	Sussex	Sussex

FLORIDA

Up to 1936, whole-time county health service in Florida had made little advancement, only 3 of the 67 counties having this type of service. The list for 1936 represents phenomenal growth, 11 counties having been added during the year, 5 of which are included in a district organization.

1932	1933	1934	1935	1936
Escambia	Escambia	Escambia	Escambia	Broward
Leon	Leon	Leon	Jackson	Calhoun [1]
Taylor			Leon	Escambia
				Franklin [1]
				Gadsden
				Gulf [1]
				Hillsborough
				Jackson
				Leon
				Liberty [1]
				Monroe
				Pinellas
				Taylor
				Wakulla [1]

[1] Included in a district of 5 counties.

GEORGIA

Georgia is one of the States having a very large number of counties, the total being 161. In 1935, 31 counties were listed as having whole-time health service; the list for 1936 includes 58. All the counties in the 1935 list, with the exception of Fulton County, also appear in the list for 1936. The large increase in counties has been due principally to the formation of districts, one of which includes 11 counties and one 15.

1932	1933	1934	1935	1936
Baldwin	Baldwin	Baldwin	Baldwin	Appling [4]
Bartow	Bartow	Bartow	Bartow	Atkinson [4]
Bibb	Bibb	Bibb	Bibb	Bacon [4]
Brooks	Brooks	Camden [2]	Camden [2]	Baldwin
Catoosa [1]	Catoosa [1]	Catoosa [1]	Catoosa [1]	Bartow
Chatham	Chatham	Chatham	Chatham	Bibb
Clarke	Clarke	Clarke	Clarke	Brantley [4]
Cobb	Cobb	Cobb	Cobb	Brooks
Colquitt	Colquitt	Colquitt	Colquitt	Bryan [4]
Dade [1]	Decatur	Decatur	Decatur	Camden [2]
Decatur	De Kalb	De Kalb	De Kalb	Catoosa [1]
De Kalb	Dougherty	Dougherty	Dougherty	Charlton [4]
Dougherty	Floyd	Floyd	Floyd	Chatham
Floyd	Fulton	Glynn [2]	Fulton	Clarke
Fulton	Glynn [2]	Grady	Glynn [2]	Clinch [4]
Glynn	Grady	Hall	Grady	Cobb
Grady	Hall	Jefferson	Hall	Coffee [4]
Hall	Jefferson	Jenkins	Jefferson	Colquitt
Jefferson	Jenkins	Laurens	Jenkins	Columbia [3]
Jenkins	Laurens	Lowndes	Laurens	Decatur
Laurens	Lowndes	McIntosh [2]	Lowndes	De Kalb
Lowndes	Mitchell	Mitchell	McIntosh [2]	Dougherty
Mitchell	Richmond	Richmond	Mitchell	Echols [4]
Richmond	Spalding	Spalding	Richmond	Floyd
Spalding	Sumter	Sumter	Spalding	Glascock [3]
Sumter	Thomas	Thomas	Sumter	Glynn [2]
Thomas	Troup	Troup	Thomas	Grady
Troup	Walker [1]	Walker [1]	Troup	Green [3]
Walker [1]	Ware	Ware	Walker [1]	Hall
Ware	Washington	Washington	Ware	Hancock [3]
Washington			Washington	Jasper [3]
				Jeff Davis [4]
				Jefferson
				Jenkins
				Lanier [4]
				Laurens
				Liberty [4]
				Long [4]
				Lowndes
				McDuffie [3]
				McIntosh [2]
				Mitchell
				Morgan [3]
				Newton [3]
				Pierce [4]
				Putnam [3]
				Richmond
				Spalding
				Sumter
				Taliaferro [3]
				Terrell
				Thomas
				Troup
				Walker [1]
				Ware
				Warren [3]
				Washington
				Wayne [4]

[1] Included in a district of 2 counties.
[2] Included in a district of 3 counties.
[3] Included in a district of 11 counties.
[4] Included in a district of 15 counties.

IDAHO

The report shows one county, Twin Falls, having whole-time health service in 1932. For the years 1933, 1934, and 1935, there were no counties having this service. In the year 1936, however, four counties were organized on a whole-time basis, including Twin Falls, which dropped out during the 3 preceding years. In view of the primitive state of health administration that existed in Idaho before 1936 the organization of four whole-time county health units is regarded as a splendid achievement. There is a total of 44 counties in the State.

1932	1933	1934	1935	1936
Twin Falls				Bannock Latah [1] Nez Perce [1] Twin Falls

[1] Included in a district of 2 counties.

ILLINOIS

For the years 1932, 1933, and 1934, only DuPage County was reported as having whole-time health service. In 1935 even this county was lacking. In 1936, however, a splendid beginning was made toward the organization of local health service. It will be noted that 24 of a total of 102 counties have been brought under the district type of local whole-time health organization.

1932	1933	1934	1935	1936
Du Page	Du Page	Du Page		Clark [2] Coles [2] Cook [1] Cumberland [2] Franklin [3] Gallatin [2] Hamilton [3] Hardin [2] Henry [3] Jasper [2] Jefferson [3] Knox [3] Lake [1] Marshall [2] Mercer [3] Peoria [2] Pope [2] Rock Island [3] Saline [2] Stark [3] Tazewell [2] Wayne [3] White [3] Woodford [2]

[1] Included in a district of 2 counties.
[2] Included in a district of 4 counties.
[3] Included in a district of 5 counties.

INDIANA

The score in Indiana is blank up to 1936 when a whole-time county health unit was organized in Lake County. The plans for the State as a whole, however, are being projected along the lines of district organization similar to that of Illinois. The report for 1937 will doubtless show a large development in this line. There is a total of 92 counties in Indiana.

1932	1933	1934	1935	1936
				Lake

IOWA

For the 3 years preceding 1936 only Woodbury County had whole-time health service. For 1936, however, the number was increased to nine, which represents a very creditable advancement over previous years. Since the total number of counties is 99, the number having whole-time health service still remains slightly less than 10 percent.

1932	1933	1934	1935	1936
Des Moines	Woodbury	Woodbury	Woodbury	Cherokee [1]
Washington				Des Moines
Woodbury				Lyon [1]
				O'Brien [1]
				Osceola [1]
				Plymouth [1]
				Sioux [1]
				Washington
				Woodbury

[1] Included in a district of 6 counties.

KANSAS

The record for Kansas is not encouraging. It will be noted that in 1932 there were 6 whole-time county health units, in 1933, 4, and for the years 1934, 1935, and 1936, the number dropped to 3. Since this State has 105 counties, it is obvious that, on the basis of past experience, the organization of local whole-time health service on a State-wide basis appears to be a long way off.

1932	1933	1934	1935	1936
Brown	Geary	Lyon	Lyon	Lyon
Geary	Lyon	Sedgwick	Sedgwick	Sedgwick
Lyon	Sedgwick	Shawnee	Shawnee	Shawnee
Marion	Shawnee			
Sedgwick				
Shawnee				

KENTUCKY

The pattern of whole-time county health service in Kentucky was very similar to that of Alabama. Of the 120 counties, 78 have whole-time health service, as compared with 75 in 1935. Moreover, each county has a separate unit, there being no grouping of counties to form districts.

1932	1933	1934	1935	1936
Adair	Adair	Adair	Adair	Adair
Allen	Allen	Allen	Allen	Allen
Anderson	Anderson	Anderson	Anderson	Anderson
Barren	Barren	Barren	Ballard	Ballard
Bath	Bath	Bath	Barren	Barren
Bell	Bell	Boyd	Bath	Bath
Boyd	Boyd	Breathitt	Bell	Bell
Breathitt	Breathitt	Butler	Boyd	Boyd
Bullitt	Bullitt	Caldwell	Breathitt	Breathitt
Butler	Butler	Calloway	Butler	Butler
Caldwell	Caldwell	Carlisle	Caldwell	Caldwell
Calloway	Calloway	Carter	Calloway	Calloway
Carlisle	Carlisle	Casey	Carlisle	Carlisle
Carter	Carter	Clinton	Carter	Carter
Casey	Casey	Edmonson	Casey	Casey
Clinton	Clinton	Elliott	Clay	Clay
Daviess	Daviess	Estill	Clinton	Clinton
Edmonson	Edmonson	Fayette	Edmonson	Cumberland
Elliott	Elliott	Fleming	Elliott	Edmonson
Estill	Estill	Floyd	Estill	Elliott
Fayette	Fayette	Fulton	Fayette	Estill
Fleming	Fleming	Gallatin	Fleming	Fayette
Floyd	Floyd	Grant	Floyd	Fleming
Fulton	Fulton	Grayson	Fulton	Floyd
Gallatin	Gallatin	Green	Gallatin	Fulton
Grant	Grant	Greenup	Grant	Gallatin
Grayson	Grayson	Hart	Grayson	Grant
Green	Green	Henderson	Green	Grayson
Greenup	Greenup	Hickman	Greenup	Green
Hancock	Hart	Hopkins	Hart	Greenup

KENTUCKY—continued

1932	1933	1934	1935	1936
Hart	Henderson	Jackson	Henderson	Hart
Henderson	Hickman	Jefferson	Hickman	Henderson
Hickman	Hopkins	Kenton	Hopkins	Hickman
Hopkins	Jackson	Knott	Jefferson	Hopkins
Jackson	Jefferson	Knox	Kenton	Jefferson
Jefferson	Kenton	Laurel	Knott	Johnson
Kenton	Knott	Lawrence	Knox	Kenton
Knott	Knox	Lee	Laurel	Knott
Knox	Laurel	Leslie	Lawrence	Knox
Laurel	Lawrence	Letcher	Lee	Laurel
Lawrence	Lee	Lincoln	Leslie	Lawrence
Lee	Leslie	Madison	Letcher	Lee
Leslie	Letcher	Marshall	Lincoln	Leslie
Letcher	Lincoln	Martin	Lyon	Letcher
Lewis	Madison	Mason	Madison	Lincoln
Lincoln	Magoffin	McCreary	Magoffin	Lyon
Madison	Marshall	McLean	Marshall	Madison
Magoffin	Martin	Meade	Martin	Magoffin
Marshall	Mason	Menifee	McCracken	Marshall
Martin	McCreary	Metcalfe	McCreary	Martin
Mason	McLean	Monroe	McLean	Mason
McCreary	Meade	Muhlenberg	Meade	McCracken
McLean	Menifee	Nicholas	Menifee	McCreary
Meade	Monroe	Ohio	Metcalfe	McLean
Menifee	Muhlenberg	Owsley	Monroe	Meade
Metcalfe	Nicholas	Perry	Muhlenberg	Menifee
Monroe	Ohio	Pike	Nicholas	Metcalfe
Morgan	Owsley	Powell	Ohio	Monroe
Muhlenberg	Perry	Pulaski	Owsley	Muhlenberg
Nicholas	Pike	Rockcastle	Perry	Nicholas
Ohio	Powell	Rowan	Pike	Ohio
Owsley	Pulaski	Scott	Powell	Owsley
Perry	Rockcastle	Todd	Pulaski	Perry
Pike	Rowan	Trigg	Rockcastle	Pike
Powell	Scott	Trimble	Rowan	Powell
Pulaski	Todd	Union	Scott	Pulaski
Robertson	Trigg	Warren	Spencer	Rockcastle
Rockcastle	Trimble	Wayne	Todd	Rowan
Rowan	Union	Webster	Trigg	Scott
Scott	Warren	Wolfe	Trimble	Spencer
Todd	Wayne		Union	Todd
Trigg	Webster		Warren	Trigg
Trimble	Wolfe		Wayne	Trimble
Union			Webster	Union
Warren			Wolfe	Warren
Wayne				Wayne
Webster				Webster
Whitley				Wolfe
Wolfe				

LOUISIANA

Of the 64 parishes in Louisiana, 34 had whole-time health service in 1935 as compared with 36 in 1936. The same parishes as are found in the former list appear in the latter, with the addition of Union and Bienville. Here also it should be noted that each parish constitutes a separate health unit.

1932	1933	1934	1935	1936
Assumption	Assumption	Assumption	Acadia	Acadia
Avoyelles	Avoyelles	Avoyelles	Assumption	Assumption
Caddo	Caddo	Caddo	Avoyelles	Avoyelles
Caldwell	Caldwell	Caldwell	Caddo	Bienville
Catahoula	Catahoula	Catahoula	Caldwell	Caddo
Claiborne	Claiborne	Caliborne	Catahoula	Caldwell
Concordia	Concordia	Concordia	Claiborne	Catahoula
De Sota	De Sota	De Sota	Concordia	Claiborne
East Carroll	East Carroll	East Carroll	De Soto	Concordia
Franklin	Franklin	Franklin	East Carroll	De Soto
Iberia	Iberia	Iberia	Franklin	East Carroll
Iberville	Iberville	Iberville	Iberia	Franklin
Lafayette	Lafayette	Lafayette	Iberville	Iberia
Lafourche	Lafourche	Lafourche	Jefferson Davis	Iberville
La Salle	La Salle	La Salle	Lafayette	Jefferson Davis
Lincoln	Lincoln	Lincoln	Lafourche	Lafayette
Madison	Madison	Madison	La Salle	Lafourche
Morehouse	Morehouse	Morehouse	Lincoln	La Salle

LOUISIANA—continued

1932	1933	1934	1935	1936
Natchitoches	Natchitoches	Natchitoches	Madison	Lincoln
Ouachita	Ouachita	Ouachita	Morehouse	Madison
Pointe Coupee	Pointe Coupee	Pointe Coupee	Natchitoches	Morehouse
Rapides	Rapides	Rapides	Ouachita	Natchitoches
Richland	Richland	Red River	Pointe Coupee	Ouachita
St. Landry	St. Landry	Richland	Rapides	Pointe Coupee
St. Martin	St. Martin	St. Landry	Red River	Rapides
St. Mary	St. Mary	St. Martin	Richland	Red River
Tensas	Tensas	St. Mary	St. Landry	Richland
Terrebonne	Terrebonne	Tensas	St. Martin	St Landry
Washington	Washington	Terrebonne	St. Mary	St. Martin
Webster	Webster	Washington	Tensas	St. Mary
West Carroll	West Carroll	Webster	Terrebonne	Tensas
		West Carroll	Washington	Terrebonne
			Webster	Union
			West Carroll	Washington
				Webster
				West Carroll

MAINE

In 1935 the only local whole-time health services were those of the Cooperative Health Union and the Motbov Union. The Cooperative Health Union reported in 1935 corresponds to Franklin County in the list for 1936. It is composed of 18 towns, whereas the Motbov Union is composed of 4 towns. Aside from the foregoing, there are 13 counties out of the total of 16, all of which have been brought under whole-time health administration during the year 1936, which represents a notable achievement.

1932	1933	1934	1935	1936
Bar Harbor	Bar Harbor	Bar Harbor	Cooperative Health Union [6]	Androscoggin.
Cooperative Health Union [4]	Cooperative Health Union [5]	Cooperative Health Union [5]	Motbov Union [1]	Aroostook
Motbov Union [1]	Motbov Union [1]	Motbov Union [1]		Cumberland
Rumford [3]	Rumford [3]	Rumford [3]		Franklin [5]
Sanford [3]	Sanford [3]	Sanford [3]		Knox
				Lincoln
				Motbov Union [1]
				Oxford
				Penobscot
				Piscataquis
				Sagadahoc
				Somerset
				Waldo
				Washington
				York

[1] Composed of 4 towns.
[2] Composed of 5 towns
[3] Town (township) wholly or partly rural.
[4] Composed of 10 towns
[5] Composed of 18 towns.
[6] Composed of 21 towns.

MARYLAND

All of the 23 counties in Maryland have been under individual whole-time health administration since 1934. In point of time Maryland is the second State to achieve 100-percent organization of this nature.

1932	1933	1934	1935	1936
Allegany	Allegany	Allegany	Allegany	Allegany
Anne Arundel	Anne Arundel	Anne Arundel	Anne Arundel	Anne Arundel
Baltimore	Baltimore	Baltimore	Baltimore	Baltimore
Calvert	Calvert	Calvert	Calvert	Calvert
Carroll	Carroll	Caroline	Caroline	Caroline
Cecil	Cecil	Carroll	Carroll	Carroll
Charles	Charles	Cecil	Cecil	Cecil
Dorchester	Dorchester	Charles	Charles	Charles
Frederick	Frederick	Dorchester	Dorchester	Dorchester
Garrett	Garrett	Frederick	Frederick	Frederick
Harford	Harford	Garrett	Garrett	Garrett
Howard	Howard	Harford	Harford	Harford
Kent	Kent	Howard	Howard	Howard
Montgomery	Montgomery	Kent	Kent	Kent
Prince Georges	Prince Georges	Montgomery	Montgomery	Montgomery
Queen Annes	Queen Annes	Prince Georges	Prince Georges	Prince Georges
Somerset	St. Marys	Queen Annes	Queen Annes	Queen Annes
Talbot	Somerset	St. Marys	St. Marys	St. Marys
Washington	Talbot	Somerset	Somerset	Somerset
Wicomico	Washington	Talbot	Talbot	Talbot
Worcester	Wicomico	Washington	Washington	Washington
	Worcester	Wicomico	Wicomico	Wicomico
		Worcester	Worcester	Worcester

MASSACHUSETTS

Inasmuch as the local form of government in Massachusetts is based on towns and townships rather than counties, it has not been found as readily adaptable to the formation of local health units. In spite of adverse circumstances of this nature, however, certain towns have voluntarily pooled their resources in the interest of forming local whole-time health units. From 1932 to 1935, three such groupings of towns operated local whole-time health units. In 1936 the same units are listed, with the addition of Franklin County.

1932	1933	1934	1935	1936
Barnstable Nashoba [1] Southern Berkshire [2]	Barnstable Nashoba [1] Southern Berkshire [2]	Barnstable Nashoba [1] Southern Berkshire [2]	Barnstable Nashoba [1] Southern Berkshire [2]	Barnstable Berkshire [3] Franklin Nashoba [4]

[1] Represents 11 towns.
[2] Represents 9 towns.
[3] Represents 15 towns
[4] Represents 10 towns.

MICHIGAN

The record for Michigan shows a considerable amount of change. From the list for 1935, 8 counties are missing in the list for 1936, whereas the latter list shows the addition of 11 new counties, making a total of 42 for 1936, a net gain of 3 over 1935. The total number of counties in the State is 83, so that the number of counties under whole-time health service in 1936 is slightly greater than 50 percent. It will be noted that the general tendency in county health service in Michigan is toward the district type of organization.

1932	1933	1934	1935	1936
Alcona [3] Allegan Alpena [3] Antrim [3] Barry Charlevoix [3] Cheboygan [3] Crawford [3] Emmet [3] Genesee Iosco [3] Isabella Kalkaska [3] Kent Lake [2] Midland Missaukee [3] Montmorency [3] Newaygo [2] Oakland Oceana [2] Ogemaw [3] Oscoda [3] Otsego [3] Ottawa Presque Isle [3] Roscommon [3] Saginaw Wexford	Alcona [3] Allegan Alpena [3] Antrim [3] Barry Charlevoix [3] Cheboygan [3] Crawford [3] Eaton Emmet [3] Genesee Iosco [3] Isabella Kalkaska [3] Kent Lake [2] Midland Missaukee [3] Montmorency [3] Newaygo [2] Oakland Oceana [2] Ogemaw [3] Oscoda [3] Otsego [3] Ottawa Presque Isle [3] Roscommon [3] Saginaw Wexford	Alcona [3] Allegan Alpena [3] Antrim [3] Barry Charlevoix [3] Cheboygan [3] Crawford [3] Eaton Emmet [3] Genessee Grosse Pointe [3] Hillsdale Iosco [3] Isabella Kalkaska [3] Kent Lake [2] Midland Missaukee [3] Montmorency [3] Newaygo [2] Oakland Oceana [2] Ogemaw [3] Oscoda [3] Otsego [3] Ottawa Presque Isle [3] Roscommon [3] Saginaw Van Buren Wexford	Alcona [3] Allegan Alpena [3] Antrim [3] Arenac [3] Barry Branch Clare [2] Charlevoix [3] Cheboygan [3] Crawford [3] Eaton Emmet [3] Genesee Gladwin [2] Hillsdale Iosco [3] Isabella Kalkaska [3] Kent Lake [2] Luce [2] Mackinac [2] Midland Missaukee [3] Montmorency [3] Newaygo [2] Oakland Oceana [2] Ogemaw [3] Oscoda [3] Otsego [3] Ottawa Presque Isle [3] Roscommon [3] Saginaw Schoolcraft [2] Van Buren Wexford	Allegan Alpena [3] Antrim [3] Arenac [3] Barry Branch Calhoun Charlevoix [3] Cheboygan [3] Chippewa Clare [2] Delta Eaton Emmet [3] Genesee Gladwin [2] Hillsdale Houghton [1] Iron Isabella Kent Keweenaw [1] Lake [2] Luce [2] Mackinac [2] Manistee [1] Mason [1] Mecosta [1] Menominee Midland Montmorency [3] Newaygo [2] Oakland Oceana [2] Osceola [1] Otsego [3] Ottawa Presque Isle [3] Saginaw Schoolcraft [2] Van Buren Wexford

[1] Included in a district of 2 counties.
[2] Included in a district of 3 counties.
[3] Included in a district of 4 counties.

MINNESOTA

Prior to 1936, only St. Louis County had whole-time health service. During 1936, nine additional counties have been brought under whole-time health service, all of which have been organized on a district basis. The total number of counties in Minnesota is 87.

1932	1933	1934	1935	1936
St. Louis	St. Louis	St. Louis	St. Louis	Beltrami [1] Blue Earth [2] Freeborn [2] Hubbard [1] Itasca [1] Jackson [2] Koochiching [1] Martin [2] Mower [2] St. Louis

[1] Included in a district of 4 counties.
[2] Included in a district of 5 counties.

MISSISSIPPI

Although the Social Security program has served to augment the facilities in the individual health units in Mississippi, no great impetus has been given to the extension of this service to new counties. In 1934 and 1935, 25 out of the 82

counties in Mississippi were served by individual whole-time health units. During the year 1936, 2 new health units were added, making the total for that year 27.

1932	1933	1934	1935	1936
Adams	Adams	Adams	Adams	Adams
Bolivar	Bolivar	Bolivar	Bolivar	Bolivar
Coahoma	Coahoma	Coahoma	Coahoma	Coahoma
Copiah	Forrest	Copiah	Copiah	Copiah
Forrest	Hancock	Forrest	Forrest	Forrest
Hancock	Harrison	Hancock	Hancock	Hancock
Harrison	Hinds	Harrison	Harrison	Harrison
Hinds	Holmes	Hinds	Hinds	Hinds
Holmes	Humphreys	Holmes	Holmes	Holmes
Humphreys	Jackson	Humphreys	Humphreys	Humphreys
Jackson	Lamar	Jackson	Jackson	Jackson
Lamar	Lauderdale	Lamar	Lamar	Lamar
Lauderdale	Lee	Lauderdale	Lauderdale	Lauderdale
Lee	Leflore	Lee	Lee	Lee
Leflore	Lincoln	Leflore	Leflore	Leflore
Lincoln	Monroe	Lincoln	Lincoln	Lincoln
Monroe	Pearl River	Monroe	Monroe	Madison
Pearl River	Pike	Pearl River	Pearl River	Marshall
Perry	Sharkey	Pike	Pike	Monroe
Pike	Sunflower	Sharkey	Sharkey	Pearl River
Sunflower	Union	Sunflower	Sunflower	Pike
Union	Warren	Union	Union	Sharkey
Warren	Washington	Warren	Warren	Sunflower
Washington	Yazoo	Washington	Washington	Union
Yazoo		Yazoo	Yazoo	Warren
				Washington
				Yazoo

MISSOURI

The progress in local health service in Missouri since 1932 was progressively downward to 1935, there having been 10 whole-time county health units in 1932 as compared with 6 in 1935. Here also the influence of Social Security funds has not been such as to create any considerable extension of local health service, since during this year only one county was added. Inasmuch as there are 114 counties in the State, much remains to be done before Missouri can be considered as adequately supplied with local health service.

1932	1933	1934	1935	1936
Boone	Buchanan	Buchanan	Buchanan	Buchanan
Buchanan	Dunklin	Dunklin	Dunklin	Dunklin
Dunklin	Greene	Greene	Greene	Greene
Greene	Jackson	Jackson	Jackson	Jackson
Jackson	Marion	Marion	Marion	Marion
Marion	Miller	Miller	Miller	Miller
Miller	New Madrid	New Madrid		St. Louis
New Madrid	Pemiscot	St. Louis		
Pemiscot	St. Louis			
St. Louis				

MONTANA

In Montana somewhat the same situation is found as that described for Missouri. During the years 1932, 1933, and 1934, four counties had whole-time health units. In 1935 the number dropped to three, and remained at that figure during 1936. The total number of counties in the State is 56.

1932	1933	1934	1935	1936
Cascade	Cascade	Cascade	Cascade	Cascade
Gallatin	Gallatin	Gallatin	Gallatin	Gallatin
Lewis and Clark	Lewis and Clark	Lewis and Clark	Missoula	Missoula
Missoula	Missoula	Missoula		

NEW MEXICO

It should be noted that in 1935 a district health law came into operation in New Mexico whereby the entire list of 31 counties was organized under a district plan of health service. The same situation is found in 1936, so that since 1935 New Mexico has been among the States having 100 percent of the counties under whole-time health administration.

1932	1933	1934	1935	1936
Bernalillo	Bernalillo	Bernalillo	Bernalillo [1]	Bernalillo [1]
Dona Ana	Dona Ana	Dona Ana	Catron [3]	Catron [3]
Eddy	Eddy	Eddy	Chaves [3]	Chaves [3]
Santa Fe	Santa Fe	Santa Fe	Colfax [3]	Colfax [3]
Union	Union	Union	Curry [2]	Curry [3]
Valencia	Valencia	Valencia	De Baca [3]	De Baca [3]
			Dona Ana [3]	Dona Ana [3]
			Eddy [3]	Eddy [2]
			Grant [3]	Grant [2]
			Guadalupe [3]	Guadalupe [3]
			Harding [2]	Harding [3]
			Hidalgo [2]	Hidalgo [3]
			Lea [3]	Lea [3]
			Lincoln [3]	Lincoln [3]
			Luna [2]	Luna [2]
			McKinley [1]	McKinley [1]
			Mora [1]	Mora [2]
			Otero [3]	Otero [3]
			Quay [3]	Quay [3]
			Rio Arriba [3]	Rio Arriba [3]
			Roosevelt [3]	Roosevelt [3]
			Sandoval [1]	Sandoval [1]
			San Juan [1]	San Juan [1]
			San Miguel [1]	San Miguel [3]
			Santa Fe [3]	Santa Fe [2]
			Sierra [3]	Sierra [3]
			Socorro [3]	Socorro [3]
			Taos [2]	Taos [2]
			Torrance [3]	Torrance [3]
			Union [3]	Union [2]
			Valencia [3]	Valencia [3]

[1] Included in a district of 2 counties.
[2] Included in a district of 3 counties
[3] Included in a district of 4 counties.

NEW YORK

The counties listed as having whole-time county health service for 1933, 1934, and 1935 in New York are Cattaraugus, Columbia, Cortland, Suffolk, and Westchester, whereas the entire list of 57 rural counties is reported for 1936 as being under whole-time health administration. This does not mean that 52 counties have been brought under this service during the year 1936. The explanation is that by misinterpretation in previous years, only those counties having individual health units were reported, whereas the report also should have shown those included in health districts.

1932	1933	1934	1935	1936
Cattaraugus	Cattaraugus	Cattaraugus	Cattaraugus	Albany [3]
Cortland	Columbia	Columbia	Columbia	Allegany [2]
Suffolk	Cortland	Cortland	Cortland	Broome [2]
Westchester	Suffolk	Suffolk	Suffolk	Cattaraugus
	Westchester	Westchester	Westchester	Cayuga [2]
				Chautauqua [4]
				Chemung [3]
				Chenango [3]
				Clinton [3]
				Columbia

[2] Included in a district of 3 counties.
[3] Included in a district of 4 counties.
[4] Included in a district of 6 counties.

NEW YORK—continued

1932	1933	1934	1935	1936
				Cortland
				Delaware [3]
				Dutchess [1]
				Erie [4]
				Essex [3]
				Franklin [3]
				Fulton [1]
				Genesee [4]
				Greene [3]
				Hamilton [3]
				Herkimer [2]
				Jefferson [3]
				Lewis [2]
				Livingston [3]
				Madison [2]
				Monroe [2]
				Montgomery [1]
				Nassau
				Niagara [4]
				Oneida [2]
				Onondaga [2]
				Ontario [3]
				Orange [3]
				Orleans [4]
				Oswego [1]
				Otsego [2]
				Putnam [1]
				Rensseloar [3]
				Rockland [3]
				St. Lawrence [2]
				Saratoga [2]
				Schenectady [2]
				Schoharie [3]
				Schuyler [1]
				Seneca [2]
				Steuben [3]
				Suffolk
				Sullivan [3]
				Tioga [2]
				Tompkins [1]
				Ulster [3]
				Warren [2]
				Washington [2]
				Wayne [1]
				Westchester
				Wyoming [4]
				Yates [2]

[1] Included in a district of 2 counties.
[2] Included in a district of 3 counties.
[3] Included in a district of 4 counties.
[4] Included in a district of 6 counties.

NORTH CAROLINA

The list for 1935 shows a total of 53 counties under whole-time health service, whereas the number in 1936 is 50, which is exactly half the total number of counties in the State. Five counties have been dropped from the list since 1935 while two new counties have been added in 1936, making a net loss of three.

1932	1933	1934	1935	1936
Beaufort	Beaufort	Beaufort	Avery [2]	Avery [2]
Bladen	Bladen	Bertie	Beaufort	Beaufort
Buncombe	Buncombe	Bladen	Bertie	Bertie
Cabarrus	Cabarrus	Buncombe	Brunswick	Buncombe
Columbus	Columbus	Cabarrus	Buncombe	Cabarrus
Cumberland	Cumberland	Columbus	Cabarrus	Columbus
Davidson	Davidson	Cumberland	Caldwell	Craven
Durham	Durham	Davidson	Columbus	Cumberland
Edgecombe	Edgecombe	Duplin	Craven	Davidson
Forsyth [1]	Forsyth [1]	Durham	Cumberland	Duplin
Franklin	Franklin	Edgecombe	Davidson	Durham
Gaston	Gaston	Forsyth [2]	Duplin	Edgecombe
Granville	Granville	Franklin	Durham	Forsyth [2]
Guilford	Guilford	Gaston	Edgecombe	Franklin
Halifax	Halifax	Granville	Forsyth [2]	Gaston

[1] Included in a district of 2 counties.
[2] Included in a district of 3 counties.

NORTH CAROLINA—continued

1932	1933	1934	1935	1936
Lenoir	Hyde	Guilford	Franklin	Graham [3]
Mecklenburg	Lenoir	Halifax	Gaston	Granville
Moore	Mecklenburg	Haywood [2]	Graham [3]	Guilford
New Hanover	Moore	Hyde	Granville	Halifax
Northampton	Nash	Jackson [2]	Guilford	Harnett
Pitt	New Hanover	Lenoir	Halifax	Haywood [3]
Randolph	Northampton	Mecklenburg	Haywood [3]	Hertford
Richmond	Pitt	Moore	Hyde	Jackson [3]
Robeson	Randolph	New Hanover	Jackson [3]	Lenoir
Rowan	Richmond	Northampton	Lenoir	Macon [3]
Rutherford	Robeson	Pitt	Macon [3]	Mecklenburg
Sampson	Rowan	Randolph	Mecklenburg	Moore
Stokes [1]	Sampson	Richmond	Moore	Nash
Surry	Stokes [1]	Robeson	Nash	New Hanover
Vance	Surry	Rowan	New Hanover	Northampton
Wake	Vance	Rutherford	Northampton	Orange [1]
Wayne	Wake	Sampson	Orange	Person [1]
Wilkes	Wayne	Stokes [2]	Pamlico	Pitt
Wilson	Wilkes	Surry	Person	Randolph
Yadkin	Wilson	Swain [2]	Pitt	Richmond
	Yadkin	Vance	Polk	Robeson
		Wake	Randolph	Rowan
		Wayne	Richmond	Rutherford
		Wilkes	Robeson	Sampson
		Wilson	Rowan	Stokes [2]
		Yadkin [2]	Rutherford	Surry
			Sampson	Swain [3]
			Stokes [2]	Vance
			Surry	Wake
			Swain [3]	Watauga [2]
			Vance	Wayne
			Wake	Wilkes
			Watauga [2]	Wilson
			Wayne	Yadkin [2]
			Wilkes	Yancey [2]
			Wilson	
			Yadkin [2]	
			Yancey [2]	

[1] Included in a district of 2 counties.
[2] Included in a district of 3 counties.
[3] Included in a district of 5 counties.

OHIO

From 1932 to 1935 there was a reduction in the number of counties having health units from 45 to 40. In 1936, however, the number increased to 48, which is the largest number of counties at any time served by whole-time health units in Ohio. All these counties, with the exception of two which are joined to form a district, have individual whole-time units. The total number of counties in the State is 88.

1932	1933	1934	1935	1936
Allen	Allen	Allen	Athens	Athens
Ashtabula	Belmont	Athens	Butler	Belmont
Belmont	Butler	Butler	Clinton	Brown
Butler	Clinton	Clinton	Crawford	Butler
Clinton	Coshocton	Coshocton	Cuyahoga	Clermont
Columbiana	Crawford	Crawford	Darke	Clinton
Coshocton	Cuyahoga	Cuyahoga	Delaware	Crawford
Crawford	Darke	Darke	Erie	Cuyahoga
Cuyahoga	Delaware	Delaware	Fayette	Darke
Darke	Erie	Erie	Guernsey	Delaware
Delaware	Fayette	Fayette	Hamilton	Erie
Erie	Hamilton	Hamilton	Hancock	Fairfield
Fayette	Hancock	Hancock	Hocking	Fayette
Franklin	Hocking	Hocking	Huron	Greene
Hamilton	Huron	Huron	Jefferson	Guernsey
Hancock	Jefferson	Jefferson	Lorain	Hamilton
Hocking	Lorain	Lorain	Lucas	Hancock
Huron	Lucas	Lucas	Madison	Hocking [1]
Jackson	Mahoning	Mahoning	Mahoning	Huron
Jefferson	Marion	Marion	Marion	Jefferson
Lorain	Medina	Medina	Medina	Lorain
Lucas	Meigs	Meigs	Meigs	Lucas
Mahoning	Mercer	Mercer	Mercer	Madison

[1] Included in a district of 2 counties.

OHIO—continued

1932	1933	1934	1935	1936
Marion	Miami	Miami	Miami	Mahoning
Medina	Montgomery	Montgomery	Montgomery	Marion
Meigs	Perry	Perry	Perry	Medina
Mercer	Pickaway	Pickaway	Pickaway	Meigs
Miami	Preble	Preble	Preble	Mercer
Montgomery	Richland	Richland	Richland	Miami
Morrow	Ross	Ross	Ross	Montgomery
Perry	Scioto	Seneca	Seneca	Morrow
Pickaway	Seneca	Shelby	Shelby	Muskingum
Preble	Shelby	Stark	Stark	Perry
Richland	Stark	Summit	Summit	Pickaway
Ross	Summit	Trumbull	Trumbull	Preble
Scioto	Trumbull	Tuscarawas	Tuscarawas	Richland
Seneca	Tuscarawas	Washington	Washington	Ross
Shelby	Washington	Wayne	Wayne	Seneca
Stark	Wayne	Wood	Wood	Shelby
Summit	Wood		Wyandot	Stark
Trumbull				Summit
Tuscarawas				Trumbull
Washington				Union
Wayne				Vinton [1]
Wood				Washington
				Wayne
				Wood
				Wyandot

[1] Included in a district of 2 counties.

OKLAHOMA

Oklahoma has had a checkered career so far as county health work is concerned. A few years ago a very creditable start was made in the development of county health work in that State. With a change in administration, however, all of this type of service was suspended. It was not until 1934 that this service was revived in Le Flore County. The following year Seminole County was added. During the year 1936, however, 17 additional counties appear in the list, so that the total now stands at 19 out of 77 counties in the State. It will be seen from the list that approximately half of these are individual health units, whereas the remainder belong to district groups.

1932	1933	1934	1935	1936
		Le Flore	Le Flore	Adair [2]
			Seminole	Beaver [1]
				Carter
				Cherokee [2]
				Cimarron [1]
				Cleveland
				Delaware [2]
				Harper [1]
				Kingfisher
				Le Flore
				Mayes [2]
				McCurtain
				Oklahoma
				Ottawa
				Payne
				Pittsburg
				Seminole
				Sequoyah [2]
				Texas [1]

[1] Included in a district of 4 counties.
[2] Included in a district of 5 counties.

OREGON

The list for 1936 is the same as that for 1935, the total being 6, or one-sixth of the entire number of counties in the State. The highest number of counties having whole-time health service in Oregon during the period covered by this report is recorded for 1932 and 1934 when for each year there were seven counties reported.

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1932	1933	1934	1935	1936
Clackamas Coos Douglas Jackson Klamath Lane Marion	Clackamas Jackson Klamath Lane Marion Multnomah	Clackamas Douglas Jackson Klamath Lane Marion Multnomah	Clackamas Douglas Jackson Klamath Lane Marion	Clackamas Douglas Jackson Klamath Lane Marion

PENNSYLVANIA

In 1931 three whole-time county health units were organized in Pennsylvania, which continued through 1933. The pattern of public health administration in this State is planned principally along the lines of centralized organization, rather than local jurisdiction, and as such is not well adapted to the growth of county units, though there would appear to be no serious contra-indication against the formation of either county or district units.

1932	1933	1934	1935	1936
Allegheny Bucks Luzerne	Allegheny Bucks Luzerne			

RHODE ISLAND

Although there are no county health units in Rhode Island which correspond to the strict interpretation of this term, there are three districts comprising five, six, and nine towns, respectively, operating whole-time health unit services. The situation with respect to local government in Rhode Island is similar to that described for Massachusetts, so that organization on a county basis is impracticable.

1932	1933	1934	1935	1936
				Woonsocket-Kent [1] South District [2] Bristol-Newport [3]

[1] District health unit composed of 5 towns.
[2] District health unit composed of 9 towns.
[3] District health unit composed of 6 towns.

SOUTH CAROLINA

For the 3 years preceding 1936, the score of whole-time health units in South Carolina stood at 23. This number was exactly doubled in 1936, so that now the entire 46 counties are included in the local health administration program. South Carolina therefore belongs to the group of 100 percent States. This has been accomplished largely through the extension of the district plan of organization.

1932	1933	1934	1935	1936
Aiken	Aiken	Aiken	Aiken	Abbeville [2]
Anderson	Anderson	Anderson	Anderson	Aiken
Beaufort	Beaufort	Beaufort	Beaufort	Allendale [2]
Berkeley	Berkeley	Berkeley	Berkeley	Anderson
Charleston	Charleston	Charleston	Charleston	Bamberg [2]
Cherokee	Cherokee	Cherokee	Cherokee	Barnwell [2]
Darlington	Darlington	Darlington	Darlington	Beaufort
Dillon	Dillon [1]	Dillon [1]	Dillon [1]	Berkeley
Dorchester	Dorchester	Dorchester	Dorchester	Calhoun [1]
Fairfield	Fairfield	Fairfield	Fairfield	Charleston
Florence	Florence	Florence	Florence	Cherokee
Georgetown	Georgetown	Georgetown	Georgetown	Chester [1]
Greenville	Greenville	Greenville	Greenville	Chesterfield [1]
Greenwood	Greenwood	Greenwood	Greenwood	Clarendon [2]
Horry	Horry	Horry	Horry	Colleton
Kershaw	Kershaw	Kershaw	Kershaw	Darlington
Lexington	Marion [1]	Marion [1]	Marion [1]	Dillon [1]
Marion	Newberry	Newberry	Newberry	Dorchester
Newberry	Oconee	Oconee	Oconee	Edgefield [2]
Oconee	Orangeburg	Orangeburg	Orangeburg	Fairfield
Orangeburg	Pickens	Pickens	Pickens	Florence
Pickens	Richland	Richland	Richland	Georgetown [1]
Richland	Spartanburg	Spartanburg	Spartanburg	Greenville
Spartanburg				Greenwood
				Hampton [1]
				Horry
				Jasper [1]
				Kershaw
				Lancaster [1]
				Laurens [2]
				Lee [2]
				Lexington [1]
				Marion [1]
				Marlboro
				McCormick [2]
				Newberry
				Oconee
				Orangeburg
				Pickens
				Richland
				Saluda [2]
				Spartanburg
				Sumter [2]
				Union [2]
				Williamsburg
				York [1]

[1] Included in a district of 2 counties
[2] Included in a district of 3 counties

SOUTH DAKOTA

For the 2 years preceding 1936 there were no counties in South Dakota having whole-time health service. During 1936, three individual county units and one district of four counties were organized, making a total of 7 counties under whole-time health service. This is regarded as a most notable advancement in view of the unprecedented drought situation which has so severely affected that State. The total number of counties in the State is 69.

1932	1933	1934	1935	1936
Pennington	Pennington			Bennett [1]
				Charles Mix
				Haakon [1]
				Hutchinson
				Jones [1]
				Union
				Washabaugh [1]

[1] Included in a district of 4 counties.

TENNESSEE

Tennessee is one of the States in which whole-time county health administration has for a number of years been firmly established. As far back as 1932 there were 41 counties in this list. In 1935 the number stood at 36. The list for 1936 shows 43 out of the 95 counties under either county or district health administration.

1932	1933	1934	1935	1936
Bledsoe [1]	Bledsoe	Anderson [1]	Bledsoe [1]	Anderson [1]
Bradley	Bradley	Bledsoe [1]	Blount	Bledsoe [1]
Carter	Davidson	Blount	Bradley	Blount
Clay [1]	Dyer	Bradley	Carter [1]	Bradley
Davidson [1]	Fentress [1]	Campbell [1]	Davidson	Campbell [1]
Dyer	Gibson	Carter [1]	Fentress [1]	Carter [1]
Fentress [1]	Giles	Davidson	Gibson	Claiborne [3]
Gibson	Greene	Dyer	Giles	Davidson
Giles	Grundy [1]	Fentress [1]	Greene	Fentress [1]
Greene	Hamilton	Gibson	Grundy	Gibson
Grundy [3]	Hardeman	Giles	Hamilton	Giles
Hamilton	Humphreys	Greene	Hardeman	Grainger [3]
Hardeman	Jackson [1]	Grundy	Humphreys	Greene
Humphreys	Knox	Hamilton	Jackson [1]	Grundy
Jackson [1]	Lake	Hardeman	Knox	Hamilton
Knox	Lauderdale	Humphreys	Lake	Hancock [3]
Lake	Lincoln	Jackson [1]	Lauderdale	Hardeman
Lauderdale	Maury	Knox	Lincoln	Hardin
Lewis	Meigs [1]	Lake	Maury	Humphreys
Lincoln	Montgomery	Lauderdale	Meigs	Jackson [1]
Maury	Obion	Lincoln	Montgomery	Knox
Meigs [1]	Rhea [1]	Maury	Obion	Lake
Monroe	Roane	Meigs [1]	Rhea	Lauderdale
Montgomery	Rutherford	Montgomery	Roane	Lincoln
Obion	Sequatchie [1]	Obion	Rutherford	Maury
Overton [1]	Sevier	Rhea [1]	Sequatchie [1]	Meigs [1]
Pickett [1]	Shelby	Roane	Sevier	Monroe
Rhea [1]	Sullivan	Rutherford	Shelby	Montgomery
Roane	Sumner	Sequatchie [1]	Sullivan	Obion
Rutherford	Tipton	Sevier	Sumner	Rhea [1]
Sequatchie [3]	Washington	Shelby	Tipton	Roane
Sevier	Weakley	Sullivan	Unicoi	Rutherford
Shelby	Williamson	Sumner	Washington	Sequatchie [1]
Sullivan	Wilson	Tipton	Weakley	Sevier
Sumner		Unicoi [1]	Williamson	Shelby
Tipton		Washington	Wilson	Sullivan
Unicoi		Weakley		Sumner
Washington		Williamson		Tipton
Weakley		Wilson		Unicoi [1]
Williamson				Washington
Wilson				Weakley
				Williamson
				Wilson

[1] Included in a district of 2 counties.
[3] Included in a district of 3 counties.

TEXAS

The growth of county health administration in Texas has been slow and uncertain. In 1935 there were nine counties served by either county or district health units, whereas the number for 1936 shows a gain of three, one county having been dropped from the 1935 list and four added to the list for 1936. When it is realized that there are 254 counties in the State of Texas, the number receiving whole-time health service is pitifully small. For a large number of the counties of Texas the adoption of district health organization is the only logical solution of the problem of local health service.

1932	1933	1934	1935	1936
Cameron Gregg Hidalgo McLennan Nolan Potter Starr Tarrant	Dallas El Paso Gregg Hidalgo McLennan Nolan Potter Tarrant	Dallas El Paso Gregg Hidalgo Nolan Potter Tarrant	Cameron Culberson [1] Dallas El Paso [1] Hidalgo Hudspeth [1] Nolan Potter Tarrant	Bell Culberson [1] Dallas El Paso [1] Hidalgo Hudspeth [1] Limestone Nolan Potter Smith Tarrant Winkler

[1] Included in a district of 3 counties.

UTAH

It will be noted that only one county in 1936 had a whole-time health unit. This is the same number as for 1935, but for the years 1932, 1933, and 1934, two counties appeared in the list. On the surface therefore it would appear that the Social Security funds have had little influence on the development of local health service in Utah. The total number of counties in that State is 29.

1932	1933	1934	1935	1936
Davis Utah	Davis Utah	Davis Utah	Davis	Davis

VIRGINIA

It will be noted that there was a very large increase in the number of counties with whole-time health organization in 1935 as compared with 1934, the number reported for the latter year being 17, and for the former, 40. There was again a substantial increase of 10 in the year 1936, so that the total now stands at 50 out of the total of 100 counties in the State. It will be observed further that the district plan of organization has been adopted in a rather extensive manner in Virginia.

1932	1933	1934	1935	1936
Accomac [3] Albemarle Amelia [2] Appomattox [2] Arlington Augusta Brunswick [3] Buckingham [2] Charlotte [2] Cumberland [2] Fairfax Greensville [3] Halifax Henrico Isle of Wight [3] Lunenburg [2] Nansemond [3] Norfolk [3] Nottoway [2] Pittsylvania Powhatan [2] Prince Edward [2] Princess Anne [3] Rockbridge Southampton	Albermarle Arlington Augusta Brunswick [4] Fairfax Greensville [4] Halifax Henrico Isle of Wight [4] Nansemond [4] Norfolk [4] Pittsylvania Prince Edward Princess Anne [4] Rockbridge Southampton	Albemarle Arlington Augusta Brunswick [3] Fairfax Greensville [3] Halifax Henrico Isle of Wight [3] Nansemond [3] Norfolk [3] Nottoway [2] Pittyslvania Prince Edward [2] Princess Anne [3] Rockbridge Southampton	Albemarle Alleghany [2] Arlington Augusta Bath [2] Brunswick [2] Buckingham [3] Dickinson [2] Elizabeth City [3] Fairfax Greene [4] Greensville [2] Halifax [1] Hanover Henrico Isle of Wight [1] James City [3] Lee [2] Madison [4] Mecklenburg [2] Montgomery Nansemond [1] Norfolk [1] Northampton Nottoway [2] Page [4]	Albemarle Alleghany [2] Arlington Augusta Bath [2] Bland Brunswick [2] Buchanan [2] Buckingham [2] Carroll Dickenson [2] Elizabeth City [3] Fairfax Grayson Greene [4] Greensville [2] Halifax Hanover Henrico Isle of Wight [1] James City [3] Lee [2] Madison [4] Mecklenburg [2] Montgomery Nansemond [1]

[1] Included in a district of 2 counties.
[2] Included in a district of 3 counties.
[3] Included in a district of 4 counties.
[4] Included in a district of 7 counties.

VIRGINIA—continued

1932	1933	1934	1935	1936
			Pittsylvania [1]	Norfolk [1]
			Prince Edward [3]	Northampton
			Princess Anne [1]	Nottaway [2]
			Rappahannock [4]	Page [4]
			Rockbridge [2]	Pittsylvania
			Rockingham [4]	Prince Edward [2]
			Scott [3]	Princess Anne [1]
			Shenandoah [4]	Pulaski
			Southampton	Rappahannock [4]
			Warren [4]	Rockbridge [2]
			Warwick [3]	Rockingham [4]
			Wise [3]	Russell [2]
			Wythe	Scott
			York [3]	Shenandoah [4]
				Smyth
				Southampton
				Sussex
				Tazewell [2]
				Warren [4]
				Warwick [3]
				Washington
				Wise [3]
				Wythe
				York [3]

[1] Included in a district of 2 counties.
[2] Included in a district of 3 counties.
[3] Included in a district of 4 counties.
[4] Included in a district of 7 counties.

WASHINGTON

From 1932 to 1935 the list remained stationary at eight. It will be noted, however, that two of the counties in the 1935 list do not appear in the list for 1936, while one county was added, so that the total for 1936 is seven, or a net loss of one as compared with 1935. It has been previously noted that North Carolina shows a net loss in 1936 as compared with 1935. Washington is the only other State in this classification. There is a total of 39 counties in the State.

1932	1933	1934	1935	1936
Chelan	Chelan	Chelan	Chelan	Chelan
Clark	Clark	Clark	Clallam	Clallam
King	King	King	Clark	Clark
Snohomish	Snohomish	Snohomish	King	King
Spokane	Spokane	Spokane	Snohomish	Spokane
Walla Walla	Walla Walla	Walla Walla	Spokane	Thurston
Whitman	Whitman	Whitman	Walla Walla	Yakima
Yakima	Yakima	Yakima	Yakima	

WEST VIRGINIA

West Virginia is another one of the States in which county health service is of comparatively long standing. The number of counties, however, has not shown a tendency to increase to any extent. Although the number for 1936 is 15, as compared with 14 for 1935, there were 15 counties in the list for 1932. It will be noted that all of the counties are individual units. Since there are 55 counties in the State, it is seen that somewhat less than one-third of the counties are organized on a whole-time basis.

1932	1933	1934	1935	1936
Berkeley	Berkeley	Berkeley	Berkeley	Berkeley
Boone	Boone	Boone	Boone	Boone
Brooke	Fayette	Fayette	Brooke	Brooke
Fayette	Hancock	Hancock	Fayette	Fayette
Hancock	Harrison	Harrison	Hancock	Hancock
Harrison	Kanawha	Kanawha	Harrison	Harrison
Kanawha	Logan	Logan	Kanawha	Kanawha
Logan	Marshall	Marshall	Logan	Logan
Marion	Monongalia	Monongalia	Marshall	Marshall
Marshall	Ohio	Ohio	Monongalia	Monongalia
Monongalia	Preston	Preston	Ohio	Ohio
Ohio	Raleigh	Raleigh	Preston	Preston
Preston	Wood	Wood	Raleigh	Raleigh
Raleigh			Wood	Wetzel
Wood				Wood

WISCONSIN

Prior to 1936 there were no whole-time county or district health organizations in the State of Wisconsin. Through special appropriations of the State legislature and through the use of Social Security funds, however, organization of the entire State on a district plan has been made possible. All of the counties with the exception of Marathon are included in district organizations of seven to nine counties each. It is understood that future plans contemplate breaking down the districts into smaller district units and individual county health departments.

1932	1933	1934	1935	1936
				Adams [2]
				Ashland [1]
				Barron [2]
				Bayfield [1]
				Brown [2]
				Buffalo [1]
				Burnett [1]
				Calumet [2]
				Chippewa [2]
				Clark [1]
				Columbia [3]
				Crawford [3]
				Dane [3]
				Dodge [2]
				Door [2]
				Douglas [1]
				Dunn [2]
				Eau Claire [2]
				Florence [2]
				Fond du Lac [2]
				Forest [2]
				Grant [3]
				Green [3]
				Green Lake [2]
				Iowa [3]
				Iron [1]
				Jackson [1]
				Jefferson [1]
				Juneau [2]
				Kenosha [1]
				Kewaunee [2]
				La Crosse [2]
				La Fayette [3]
				Langlade [2]
				Lincoln [2]
				Manitowoc [2]
				Marathon
				Marinette [2]
				Marquette [2]
				Milwaukee [1]
				Monroe [2]
				Oconto [2]
				Oneida [2]
				Outagamie [2]

[1] Included in a district of 7 counties.
[2] Included in a district of 8 counties.
[3] Included in a district of 9 counties.

WISCONSIN—continued

1932	1933	1934	1935	1936
				Ozaukee [3] Pepin [1] Pierce [3] Polk [3] Portage [1] Price [2] Racine [1] Richland [3] Rock [1] Rusk [2] Sauk [3] Sawyer [1] Shawano [3] Sheboygan [2] St. Croix [3] Taylor [2] Trempeleau [1] Vernon [3] Vilas [2] Walworth [1] Washburn [1] Washington [3] Waukesha [1] Waupaca [2] Waushara [2] Winnebago [2] Wood [1]

[1] Included in a district of 7 counties.
[2] Included in a district of 8 counties.
[3] Included in a district of 9 counties.

SUMMARY

The recapitulation (table 1) of the information presented in the preceding tables shows a total of 946 counties in the United States under some form of local whole-time health administration on December 31, 1936, as compared with 615 on December 31, 1935. It will be noted that there has been a net gain of 331 counties, which represents an increase of 41.7 percent.

TABLE 1.—*Number of counties having whole-time health service as of December 31, 1932, 1933, 1934, 1935, and 1936, and increase or decrease during the years 1933 to 1936*

State	Number of counties					Increase or decrease in—			
	Dec. 31, 1932	Dec. 31, 1933	Dec. 31, 1934	Dec. 31, 1935	Dec. 31, 1936	1933	1934	1935	1936
Alabama	54	46	50	56	57	−8	+4	+6	+1
Arizona	4	4	4	4	5	-------	-------	-------	+1
Arkansas	27	21	19	19	39	−6	−2	-------	+20
California	14	13	15	16	16	−1	+2	+1	-------
Connecticut	2	2	2	0	0	-------	-------	−2	-------
Delaware	3	3	3	3	3	-------	-------	-------	-------
Florida	3	2	2	3	14	−1	-------	+1	+11
Georgia	31	30	30	31	58	−1	-------	+1	+27
Idaho	1	0	0	0	4	−1	-------	-------	+4
Illinois	1	1	1	0	24	-------	-------	−1	+24
Indiana	0	0	0	0	1	-------	-------	-------	+1
Iowa	3	1	1	1	9	−2	-------	-------	+8
Kansas	6	4	3	3	3	−2	−1	-------	-------
Kentucky	79	73	70	75	78	−6	−3	+5	+3
Louisiana	31	31	32	34	36	-------	+1	+2	+2
Maine	5	5	5	2	15	-------	-------	−3	+13
Maryland	21	22	23	23	23	+1	+1	-------	-------
Massachusetts	3	3	3	3	4	-------	-------	-------	+1

TABLE 1.—*Number of counties having whole-time health service as of December 31, 1932, 1933, 1934, 1935, and 1936, and increase or decrease during the years 1933 to 1936*—Continued

State	Number of counties					Increase or decrease in—			
	Dec. 31, 1932	Dec. 31, 1933	Dec. 31, 1934	Dec. 31, 1935	Dec. 31, 1936	1933	1934	1935	1936
Michigan	29	30	33	39	42	+1	+3	+6	+3
Minnesota	1	1	1	1	10				+9
Mississippi	25	24	25	25	27	−1	+1		+2
Missouri	10	9	8	6	7	−1	−1	−2	+1
Montana	4	4	4	3	3			−1	
New Mexico	6	6	6	31	31			+25	
New York	4	5	5	5	57	+1			[1] +52
North Carolina	35	36	41	53	50	+1	+5	+12	−3
Ohio	45	40	39	40	48	−5	−1	+1	+8
Oklahoma	0	0	1	2	19		+1	+1	+17
Oregon	7	6	7	6	6	−1	+1	−1	
Pennsylvania	3	3	0	0	0		−3		
Rhode Island	0	0	0	0	5				+5
South Carolina	24	23	23	23	46	−1			+23
South Dakota	1	1	0	0	7		−1		+7
Tennessee	41	34	39	36	43	−7	+5	−3	+7
Texas	8	8	7	9	12		−1	+2	+3
Utah	2	2	2	1	1			−1	
Virginia	25	16	17	40	50	−9	+1	+23	+10
Washington	8	8	8	8	7				−1
West Virginia	15	13	13	14	15	−2		+1	+1
Wisconsin	0	0	0	0	71				+71
Total	581	530	542	615	946	−51	+12	+73	+331

[1] The large increase in counties having whole-time health service in New York did not occur during the year 1936 as the table seems to indicate New York State has been organized for several years on the district unit basis Due to a misinterpretation in previous statements of counties having whole-time health service those counties included in district organizations in New York were not reported.

Table 2 presents, by States, the percentage of rural population having health service under the direction of local whole-time health officers at the end of the calendar year 1936.

Of the 946 counties, townships, or districts with health service under whole-time local health officers at the close of 1936, 926, or 97.7 percent, were receiving financial assistance for the support of their health service from one or more of the following agencies:, The State Board of Health, the United States Public Health Service, the Rockefeller Foundation, the American Red Cross, the American Women's Hospital Fund, the Rosenwald Fund, the Commonwealth Fund, and the Milbank Memorial Fund.

STATE	COUNTIES UNDER FULL TIME ADMINISTRATION				
	JAN. 1	DEC. 31			
	1933	1934	1935	1936	%
1 DELAWARE	3	3	3	3	100.0
2 MARYLAND	22	23	23	23	100.0
3 NEW MEXICO	6	6	31	31	100.0
4 NEW YORK	5	5	5	57	100.0
5 SO. CAROLINA	23	23	23	46	100.0
6 WISCONSIN	0	0	0	71	100.0
7 ALABAMA	46	50	56	57	88.5
8 MAINE	5	5	2	15	86.1
9 RHODE ISLAND	0	0	0	5	74.0
10 KENTUCKY	73	70	75	78	69.9
11 LOUISIANA	31	32	34	36	63 6
12 NO. CAROLINA	36	41	53	50	62.6
13 ARIZONA	4	4	4	5	61.8
14 VIRGINIA	16	17	40	50	61.8
15 OHIO	40	39	40	48	61.4
16 ARKANSAS	21	19	19	39	59.4
17 CALIFORNIA	13	15	16	16	57.2
18 TENNESSEE	34	39	36	43	55.4
19 MICHIGAN	30	33	39	42	47.1
20 WEST VIRGINIA	13	13	14	15	43.6
21 MISSISSIPPI	24	25	25	27	43.2
22 WASHINGTON	8	8	8	7	38.8
23 GEORGIA	30	30	31	58	38 4
24 OREGON	6	7	6	6	36.8
25 OKLAHOMA	0	1	2	19	26.4
26 FLORIDA	2	2	3	14	25.1
27 ILLINOIS	1	1	0	24	24 0
28 MISSOURI	9	8	6	7	18.5
29 IDAHO	0	0	0	4	18.4
30 MASSACHUSETTS	3	3	3	4	14.4
31 MINNESOTA	1	1	1	10	14.4
32 SO. DAKOTA	1	0	0	7	10.4
33 IOWA	1	1	1	9	9.9
34 MONTANA	4	4	3	3	8.0
35 TEXAS	8	7	9	12	7.9
36 KANSAS	4	3	3	3	5.7
37 UTAH	2	2	1	1	4.6
38 INDIANA	0	0	0	1	1.6
39 PENNSYLVANIA	3	0	0	0	0.0
40 CONNECTICUT	2	2	0	0	0.0
41 COLORADO	0	0	0	0	0.0
42 NEBRASKA	0	0	0	0	0.0
43 NEVADA	0	0	0	0	0.0
44 NEW HAMPSHIRE	0	0	0	0	0.0
45 NEW JERSEY	0	0	0	0	0.0
46 NO. DAKOTA	0	0	0	0	0.0
47 VERMONT	0	0	0	0	0.0
48 WYOMING	0	0	0	0	0.0
TOTALS.	530	542	615	946	41.7

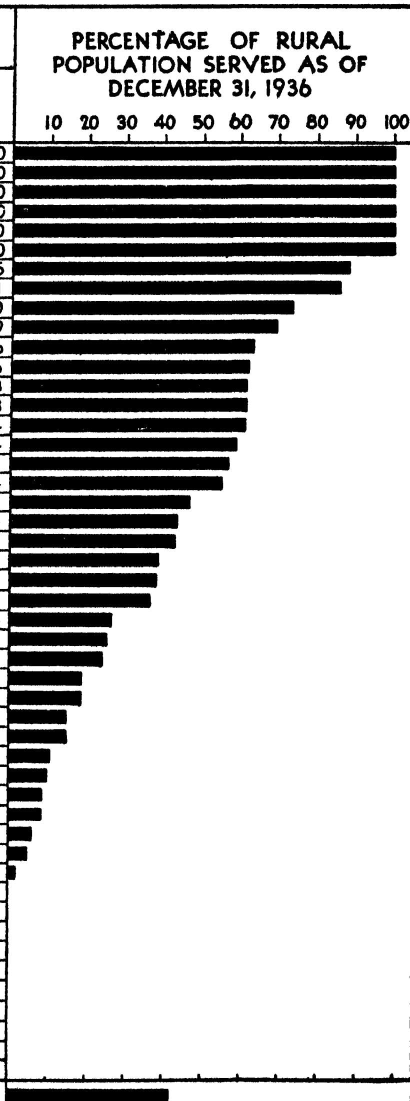

FIGURE 1.—Number of whole-time county or local district health units, by States, 1933–36, and percentage of rural population served on December 31, 1936.

TABLE 2.—*Percentage of rural population having on Dec. 31, 1936, health service under local whole-time health officers*

State	Rural population as of Dec. 31, 1936 (estimate from 1930 census)	Rural population with local health service under direction of whole-time health officers	Percentages of rural population with local health service under direction of whole-time health officers
Alabama	1,943,540	1,720,695	88.5
Arizona	331,208	204,988	61.8
Arkansas	1,478,121	879,335	59.4
California	1,794,237	1,026,535	57.2
Colorado	535,361	0	0.0
Connecticut	495,442	0	0.0
Delaware	123,794	123,794	100.0
Florida	771,512	194,356	25.1
Georgia	2,013,016	774,936	38.4
Idaho	317,300	58,614	18.4
Illinois	1,994,927	479,160	24.0
Indiana	1,442,611	24,150	1.6
Iowa	1,491,647	148,787	9.9
Kansas	1,151,165	66,372	5.7
Kentucky	1,836,950	1,284,279	69.9
Louisiana	1,332,409	848,646	63.6
Maine	480,838	414,190	86.1
Maryland	706,980	706,980	100.0
Massachusetts	560,480	81,134	14.4
Michigan	1,614,925	761,691	47.1
Minnesota	1,306,337	188,832	14.4
Mississippi	1,750,305	756,504	43.2
Missouri	1,770,248	327,540	18.5
Montana	356,570	28,718	8.0
Nebraska	892,377	0	0.0
Nevada	56,594	0	0.0
New Hampshire	211,240	0	0.0
New Jersey	716,003	0	0.0
New Mexico	330,403	330,403	100.0
New York	2,244,396	2,244,396	100.0
North Carolina	2,552,504	1,599,006	62.6
North Dakota	573,405	0	0.0
Ohio	2,176,907	1,337,159	61.4
Oklahoma	1,630,699	431,902	26.4
Oregon	511,236	188,313	36.8
Pennsylvania	3,097,139	0	0.0
Rhode Island	76,336	56,489	74.0
South Carolina	1,367,685	1,367,685	100.0
South Dakota	579,898	60,620	10.4
Tennessee	1,720,018	953,705	55.4
Texas	3,622,932	289,111	7.9
Utah	246,700	11,450	4.6
Vermont	240,845	0	0.0
Virginia	1,637,046	1,012,876	61.8
Washington	725,593	282,162	38.8
West Virginia	1,331,875	581,950	43.6
Wisconsin	1,385,163	1,385,163	100.0
Wyoming	167,595	0	0.0
Total	55,694,512	23,232,626	41.7

Reference to figure 1 reveals the fact that there are now six States in which 100 percent of the counties are served by either individual county health units or district health units. The following States have not at any time developed whole-time county health service as defined in the explanatory remarks preceding table 1:

Nebraska	New Jersey
Nevada	North Dakota
New Hampshire	Vermont

Figure 2 shows the location of the counties, townships, or districts in the United States with health service for rural areas under the

direction of whole-time health officers on December 31, 1936. It will be noted, however, that no distinction is made in the type of service maintained in the different counties. In reducing the map to

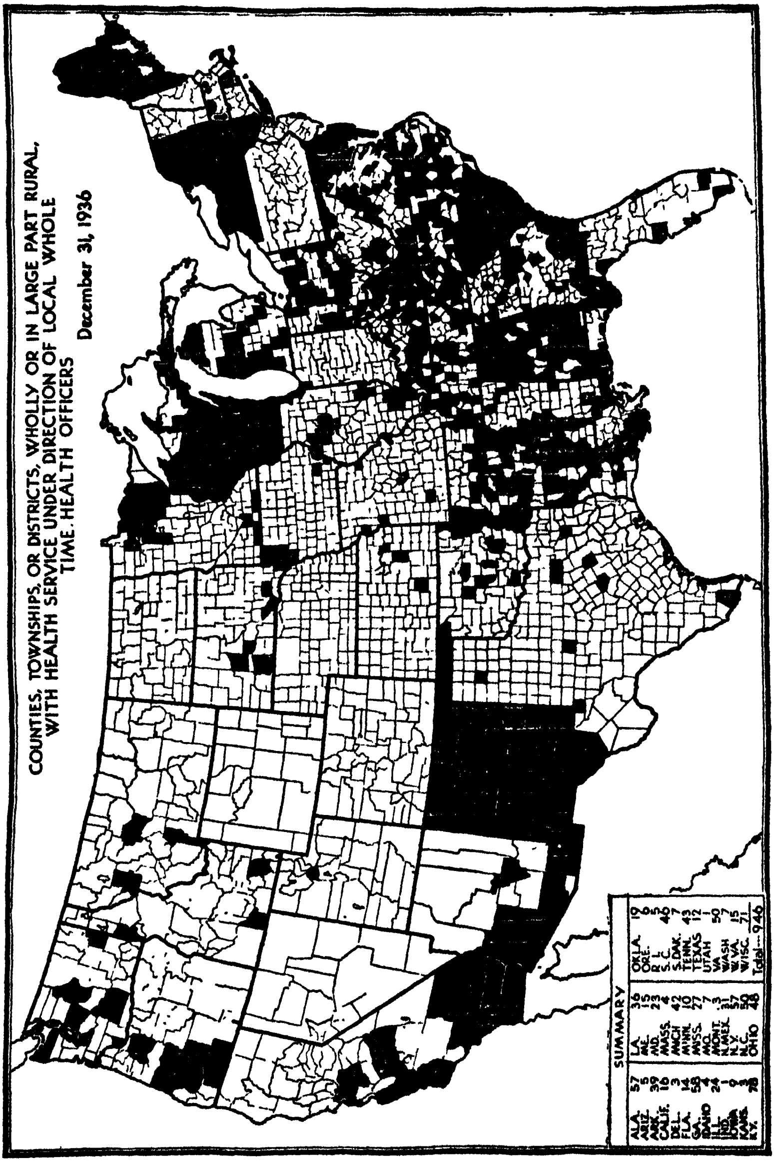

FIGURE 2.—Rural areas (in black) having whole-time health service, December 31, 1935.

a size suitable for reproduction in this report, it was found impracticable to attempt any form of code which would show a distinction between county and district organizations.

DIRECTORY OF WHOLE-TIME COUNTY HEALTH OFFICERS, 1937*

Each year the Public Health Service publishes information as to the extent of whole-time rural health service in the United States, giving the names of the counties so served in each State. The tabulation presented here supplements that information by giving the name, address, and official title of the whole-time county and district health officers. It would also serve a useful purpose to have a complete list of personnel for each whole-time county or district health unit, but this would involve considerable detail, and such information can be obtained for any county or district listed in this directory by communicating with the health officer.

State and county	Name of health officer	Post office	Official title
Alabama:			
Baldwin	P. M Thompson, M. D	Bay Minette	County health officer.
Barbour	E M Moore, M. D	Clayton	Do.
Blount	W A. Dodson, M. D	Oneonta	Do.
Bullock	H R. Owen, M. D	Union Springs	Do.
Calhoun	G. A. Cryer, M. D	Anniston	Do.
Chambers	C. E. Johnson, M. D	Lafayette	Do.
Cherokee	S C. Tatum, M. D	Center	Do.
Chilton	J. M Kimmey, M. D	Clanton	Do
Cleburne	F. R. Wood, M. D	Heflin	Do.
Coffee	H. T. Donovan, M. D	Elba	Do.
Colbert	R. E. Harper, M. D	Tuscumbia	Do.
Conecuh	E L Kelly, M. D	Evergreen	Do.
Coosa	W. D Burkhalter, M. D	Rockford	Do.
Covington	C. D. McLeod, M. D	Andalusia	Do.
Crenshaw	J. O Foster, M D	Luverne	Do
Cullman	M. S. Whiteside, M. D	Cullman	Do.
Dale	W. L. Orr, M. D	Ozark	Do.
Dallas	L. T. Lee, M. D	Selma	Do.
De Kalb	J. E. Dunn, M. D	Fort Payne	Do.
Elmore	C. S. Cotlin, Jr , M. D	Wetumpka	Do
Escambia	W. J. Donald, M. D	Brewton	Do
Etowah	C. L. Murphree, M. D	Gadsden	Do.
Franklin	N. P. Underwood, M. D	Russellville	Do.
Henry	W. L. Chambers, M. D	Abbeville	Do.
Houston	W. T Burkett, M. D	Dothan	Do.
Jackson	G. E. Newton, M. D	Scottsboro	Do.
Jefferson	J. D. Dowling, M D	Birmingham	Do
Lamar	D. R. Brown, M. D	Vernon	Do
Lauderdale	W. D. Hubbard, M. D	Florence	Do.
Lawrence	C. J. Fisher, M. D	Moulton	Do.
Lee	H. C. McRee, M. D	Opelika	Do
Limestone	F. N. Hall, M. D	Athens	Do.
Lowndes	E. F. Leatherwood, M. D	Hayneville	Do.
Macon	Murray Smith, M. D	Tuskegee	Do.
Madison	W. C. Hatchett, M. D	Huntsville	Do.
Marengo	E. T. Norman, M. D	Linden	Do.
Marion	T. L. Owings, M. D	Hamilton	Do.
Marshall	Lee Weathington, M. D	Guntersville	Do.
Mobile	O. L. Chason, M. D	Mobile	Do.
Monroe	M. F. Parker, M. D	Monroeville	Do.
Montgomery	J. L. Bowman, M. D	Montgomery	Do.
Morgan	L. R. Murphree, M. D	Decatur	Do.
Perry	J. R. Long, M. D	Marion	Do.
Pickens	J. J. Croley, M. D	Carrollton	Do.
Pike	W. H. Abernethy, M. D	Troy	Do.
Randolph	W. A. Edwards, M. D	Wedowee	Do.
Russell	M. L. Shaddix, M. D	Phenix City	Do.
Shelby	H. C. Nickson, M. D	Columbiana	Do.
Sumter	R. V. Taylor, M. D	Livingston	Do.
Talladega	J. H. Hill, M. D	Talladega	Do.
Tallapoosa	C. C. Fargason, M. D	Dadeville	Do.
Tuscaloosa	A. A. Kirk, M. D	Tuscaloosa	Do.
Walker	A. M. Waldrop, M. D	Jasper	Do.
Washington	I. C. Sumner, M. D	Chatom	Do.
Wilcox	E. L. McIntosh, M. D	Camden	Do.
Winston	H. A. McClure, M. D	Double Springs	Do.

*As of January 1, 1937.

State and county	Name of health officer	Post office	Official title
Arizona:			
Cochise	R. B. Durfee, M. D	Bisbee	Director.
Gila	G. F. Manning, M. D	Globe	Do.
Maricopa	A. N. Crain, M. D	Phoenix	Do.
Pima	Lewis H Howard, M. D	Tucson	Do.
Yuma	Jack B. Eason, M. D	Yuma	Do.
Arkansas:			
Conway	John M. Smith, M. D	Morrilton	Do.
Crittenden	B. M. Stevenson, M. D	Marion	Do.
Drew	Seldon W Chambers, M. D	Monticello	Do.
Garland	J F. Merritt, M. D	Hot Springs	Do.
Jefferson	W. H Bruce, M. D	Pine Bluff	Do.
Mississippi	R. E. Schirmer, M. D	Blytheville	Do.
Pulaski	J. A. Summers, M. D	Little Rock	Do.
Sebastian	J. E. Johnson, M. D	Fort Smith	Do.
St. Francis	W. A. Winter, M. D	Forrest City	Do.
District No. 1	R. J. Turner, M. D	Fayetteville	Do.
Benton.			
Crawford.			
Washington.			
District No. 2	A. M. Gibbs, M. D., C. P. H.	Hamburg	Do.
Ashley.			
Chicot.			
District No. 3	J. K. Grace, M. D	Arkadelphia	Do.
Clark.			
Hempstead.			
Nevada.			
District No. 4	Marcus T. Smith, M. D	Conway	Do.
Cleburne.			
Faulkner.			
District No. 5	J. W. Ringgold, M. D	Ashdown	Do.
Howard			
Little River.			
Sevier.			
District No. 6	F. S. Dozier, M. D	Clarendon	Do
Arkansas.			
Monroe.			
District No. 7	R. C. Kennerly, M. D	Camden	Do.
Calhoun.			
Dallas.			
Ouachita.			
District No 8	W. B. Bruce, M. D	Helena	Do.
Lee.			
Phillips.			
District No. 9	A. B. Tate, M. D	Russellville	Do.
Johnson.			
Pope.			
Yell.			
District No. 10	Thomas C. Watson, M. D	Benton	Do.
Grant.			
Hot Spring.			
Saline.			
District No. 11	J. F. Hays, M. D	Augusta	Do.
Cross.			
White.			
Woodruff.			
Jackson.	M. B. Owens, M. D	Newport	Assistant director.
California:			
Alameda	I. O. Church, M. D., C. P. H.	Oakland	County health officer.
Contra Costa	W. A. Powell, M. D	Martinez	Do.
Fresno	W. F. Stein, M. D.	Fresno	Do.
Imperial	W. F. Fox, M. D	El Centro	Do.
Kern	Myrnie L. Gifford, M. D., C. P. H.	Kernville	Assistant county health officer.
Los Angeles	J. L Pomeroy, M. D	Los Angeles	County health officer.
Madera	L. A. Stone, M. D	Madera	Do.
Monterey	R. M. Fortier, M. D	Salinas	Do.
Orange	K. H. Sutherland, M. D	Santa Ana	Do.
Riverside	W. A. Jones, M. D	Riverside	Do.
San Bernardino	E. B. Godfrey, M. D	San Bernardino	Do.
San Diego	A. M. Lesem, M. D	San Diego	Do.
San Joaquin	J. J. Sippy, M. D	Stockton	District health officer.
San Luis Obispo	A. F. Gillihan, M. D	San Luis Obispo	County health officer.
San Mateo	C. C. Gans, M. D	San Mateo	Do.
Santa Barbara	R C. Main, M. D	Santa Barbara	Do.
Stanislaus	E. F. Reamer, M. D	Modesto	Do.
Delaware.			
Kent	E. F. Smith, M. D	Dover	Director county health unit.
New Castle	J. R. Downes, M. D	Newark	Do.
Sussex	F. I. Hudson, M. D	Georgetown	Do.
Florida:			
Broward	Paul G. Shell, M. D	Fort Lauderdale	Director.
Escambia	W. H. Pickett, M. D., C. P. H.	Pensacola	Do.

State and county	Name of health officer	Post office	Official title
Florida—Continued.			
Gadsden	C. W. McDonald, M. D	Quincy	Director.
Highlands	C. W. Pease, M. D	Avon Park	Do.
Hillsborough	J. S. Spoto, M. D., C. P. H	Tampa	Do.
Jackson	R. N. Joyner, M. D	Marianna	Do.
Leon	L. J. Graves, M. D	Tallahassee	Do.
Monroe	J. B. Parramore, M. D, C. P. H.	Key West	Do.
Pinellas	T. E. Morgan, M. D., M. P. H.	Clearwater	Do.
Taylor	C. A. O'Quinn, M. D., C. P. H.	Perry	Do.
Wakulla	L. C. Gonzales, M. D., C. P. H.	Wakulla	District health officer.
District health unit: Calhoun. Franklin. Gulf. Liberty.	J. W. McMurray, M. D., C. P. H.	Apalachicola	Director.
Georgia:			
Baldwin	O. F. Moran, M. D	Milledgeville	Commissioner of health.
Bartow	A. C. Shamblin, M. D	Cartersville	Do.
Bibb	J. D. Applewhite, M. D., M. P. H.	Macon	Do.
Brooks	M. E. Groover, Jr , M. D	Quitman	Do.
Chatham	Victor H. Bassett, M. D	Savannah	Do.
Clarke	W W. Brown, M. D	Athens	Do.
Cobb	J E. Lester, M. D	Marietta	Do.
Colquitt	T. H. Chesnutt, M. D	Moultrie	Do.
Decatur	M. A. Fort, M. D., D. P. H., Ph. G.	Bainbridge	Do.
De Kalb	J. R. Evans, M. D., Ph. G	Decatur	Do.
Dougherty	Thomas W. Collier, M. D	Albany	Do.
Floyd	B. V. Elmore, M. D	Rome	Do.
Fulton	W. L. Gilbert, M. D	Atlanta	Do.
Glynn-McIntosh-Camden.	M. E. Winchester, M. D., C. P H., D. P. H.	Brunswick	Do.
Grady	H. P. Rankin, M. D	Cairo	Do.
Hall	W. D. Cagle, M. D	Gainesville	Do.
Jefferson	L. R. Bryson, M. D	Louisville	Do.
Jenkins	H. B. Senn, M. D	Millen	Do.
Laurens	O. H. Cheek, M. D	Dublin	Do.
Lowndes	Gordon T. Crozier, M. D., D. P. H.	Valdosta	Do.
Mitchell	C. O. Rainey, M. D	Camilla	Do.
Richmond	Thomas B. Phinizy, M. D	Augusta	Do.
Spalding	W. C. Humphries, M. D	Griffin	Do.
Sumter	W. Franklin Castellow, M. D.	Americus	Do.
Telfair-Wheeler	Walter L. Shepeard, M. D	McRae	Do.
Terrell	R. Frank Cary, M. D	Dawson	Do.
Thomas	J. R. Dykes, M. D	Thomasville	Do.
Tift	R. Floyd Payne, M. D	Tifton	Do.
Troup	S. C. Rutland, M. D	LaGrange	Do.
Walker-Catoosa	Richard C. Shepard, M. D	LaFayette	Do.
Ware	George E. Atwood, M. D., D. P. H.	Waycross	Do.
Washington	O. L. Rogers, M. D	Sandersville	Do.
State Health District No. 6. Appling. Atkinson. Bacon. Brantley. Bryan. Charlton. Clinch. Coffee. Echols. Jeff Davis. Lanier. Liberty. Long. Pierce. Wayne.	F. A. Brink, M. D	Blackshear	Do.
State Health District No. 7. Columbia. Glascock. Greene. Hancock. Jasper. McDuffie. Morgan. Newton. Putnam. Taliaferro. Warren.	Loren Wallin, M. D	Sparta	Do.

State and county	Name of health officer	Post office	Official title
Idaho:			
Bannock	M. B. McQueen, M. D	Pocatello	Director.
Nez Perce-Latah	M. W. Caskey, M. D	Lewiston	Do.
Twin Falls	James W. Hawkins, M. D	Twin Falls	Do.
Illinois:			
District No. 1	C. W. Van Wormer, M. D	Homewood	District health superintendent.
Cook.			
Lake.			
District No. 3	J. A. Poling, M. D	Freeport	Do.
Boone.			
McHenry.			
Stephenson.			
Winnebago.			
District No. 5	Carl Peterson, M. D	Moline	Do
Henry.			
Knox.			
Rock Island.			
Stark.			
District No. 9	Sandor Horwitz, M. D	Peoria	Do.
Marshall.			
Peoria.			
Tazewell.			
Woodford.			
District No. 13	Loren E. Orr, M. D	Greenview	Do.
Logan.			
Mason.			
Menard.			
Sangamon.			
District No. 16	Nettie Dorris, M. D	Paris	Do
Clark.			
Coles.			
Cumberland.			
Edgar.			
Moultrie.			
District No. 23	Roland R. Cross, M. D	Dahlgren	Do.
Franklin.			
Hamilton.			
Jefferson.			
White.			
District No. 25	L. S. Barger, M. D	Golconda	Do.
Gallatin.			
Hardin.			
Pope.			
Saline.			
Williamson.			
Indiana:			
Lake	William D. Weis, M. D	Crown Point	County health commissioner.
Iowa:			
Des Moines	Arthur C Schach, M. D	Burlington	Health officer.
Washington	R. M Sorenson, M. D	Washington	Do.
Woodbury	W. S. Petty, M. D	Sioux City	Do.
District Health Service No. 1.	William Trotter, M. D	Cherokee	Do.
Cherokee.			
Lyon.			
O'Brien.			
Osceola.			
Plymouth.			
Sioux.			
Kansas:			
Lyon	C. H. Munger, M. D	Emporia	County health officer.
Sedgwick	J. C. Montgomery, M. D	Wichita	Do.
Shawnee	F. E McCord, M D	Topeka	Do.
Kentucky:			
Adair	N. A. Mercer, M. D., M. P. H.	Columbia	Do.
Allen	C. W. Holland, M D	Scottsville	Do.
Anderson	Lee A. Dare, M. D	Lawrenceburg	Do.
Ballard	C. B. Billington, M D	Wickliffe	Do.
Barren	W. M. Chapman, M. D	Glasgow	Do.
Bath	J. S. Goodpaster, M. D	Owingsville	Do.
Bell	R. B. Fulks, M. D	Pineville	Do.
Boyd	R. D. Higgins, M. D., M. P. H.	Ashland	Do.
Breathitt	L. R. McCormack, M. D	Jackson	Do.
Butler	O. C. Threlkel, M. D	Morgantown	Do.
Caldwell	J. M. Dishman, M. D	Princeton	Do.
Calloway	J. A. Outland, M. D	Murray	Do.
Carlisle	J. F. Harrell, M. D	Bardwell	Do.
Carter	Don E. Wilder, M. D	Grayson	Do.
Casey	G. F. Brockman, M. D	Liberty	Do.
Clay	L. H. Wagers, M. D	Manchester	Do.
Clinton	W. G. Morgan, M. D	Albany	Do.
Cumberland	H. H. Bishop, M. D	Burkesville	Do.
Edmonson	L. E. Johnson, M. D	Brownsville	Do.

State and county	Name of health officer	Post office	Official title
Kentucky—Continued.			
Elliott	Temporary vacancy	Sandy Hook	County health officer.
Estill	R. R. Snowden, M. D	Irvine	Do.
Fayette	Chas. D. Cawood, M. D., C. P. H.	Lexington	Do.
	Earl E. Gambill, M. D	do	Assistant county health officer.
Fleming	C W. Christine, M. D	Flemingsburg	County health officer.
Floyd	Marvin Ransdell, M. D	Prestonsburg	Do.
Fulton	Gradie R. Rowntree, M. D., C. P. H.	Hickman	Do.
Gallatin	H. A Shields, M. D	Warsaw	Do.
Grant	N. H. Ellis, M D	Williamstown	Do.
Grayson	L C. Wray, M. D	Leitchfield	Do.
Green	J. W. Miller, M. D	Greensburg	Do
Greenup	A. F Smith, M. D	Greenup	Do.
Hart	E. M. Thompson, M. D	Munfordville	Do.
Henderson	J. Leland Tanner, M. D., M. P. H	Henderson	Do.
Hickman	Chas. Hunt, M. D	Clinton	Do.
Hopkins	C. R. Morton, M. D	Madisonville	Do.
Jefferson	John D. Trawick, M. D	Louisville	Do.
Johnson	R. E. Wehr, M. D	Paintsville	Do.
Kenton	H. C. White, M. D	Covington	Do.
Knott	J. W. Duke, M. D	Hindman	Do
Knox	W. V. Bradshaw, M. D	Barbourville	Do.
Laurel	G. S. Brock, M. D	London	Do
Lawrence	A. M. Lyon, M. D	Louisa	Do
Lee	E M Brown, M. D	Beattyville	Do.
Leslie	W. W Buckhold, M D	Hyden	Do.
Letcher	R D. Collins, M. D., M P H.	Whitesburg	Do.
Lincoln	K T Johnstone, M. D	Stanford	Do.
Lyon	N. M Atkins, M. D	Eddyville	Do.
McCracken	R E. Teague, M. D., C. P. H.	Paducah	Do
McCreary	C R Markwood, M. D	Whitley City	Do
McLean	P D. Moore, M D	Calhoun	Do
Madison	H G Wells, M. D , C. P. H	Richmond	Do.
Magoffin	H K. Bailey, M. D	Salyersville	Do
Marshall	S. L Henson, M. D	Benton	Do.
Martin	Wm N. Keith, M D	Inez	Do
Mason	O. M. Goodloe, M D., C. P. H.	Maysville	Do.
Meade	O. R Lynch, M D	Brandenburg	Do.
Menifee	E T. Riley, M. D	Frenchburg	Do.
Metcalfe	H. T. Carter, M D	Edmonton	Do.
Monroe	A. S. Yates, M. D	Tompkinsville	Do.
Muhlenberg	Roy Orsburn, M. D	Greenville	Do.
Nicholas	J. W. Scudder, M. D	Carlisle	Do.
Ohio	A. D. Park, M D	Hartford	Do.
Owsley	J. R. Akor, M D	Booneville	Do.
Perry	D. D. Turner, M. D	Hazard	Do.
Pike	C P Shields, M. D	Pikeville	Do.
Powell	S. T. Scrivner, M. D	Stanton	Do.
Pulaski	E. A. Steiner, M. D	Somerset	Do.
Rockcastle	Walker Owens, M. D	Mt. Vernon	Do.
Rowan	T. A E. Evans, M. D	Morehead	Do.
Scott	C. M. Gambill, M. D., M. P. H.	Georgetown	Do.
Spencer	M. H. Skaggs, M. D , C P H	Taylorsville	Do
Todd	L. A. Crosby, M D	Elkton	Do.
Trigg	J. O. Nall, M. D	Cadiz	Do
Trimble	J. J. Gerkins, M. D	Bedford	Do.
Union	E. W Atherton, M. D	Morganfield	Do
Warren	G. M. Wells, M D	Bowling Green	Do.
Wayne	Mack Roberts, M. D	Monticello	Do.
Webster	C. M. Smith, M. D	Dixon	Do.
Wolfe	J. L. Cox, M D	Campton	Do.
Louisiana: [1]			
Acadia	J. D. Hunter, M. D	Crowley	Director.
Assumption	P. M. Payne, M. D	Napoleonville	Do.
Avoyelles	L. W. Holloman, M. D	Marksville	Do.
Bienville	B. O. Morrison, M. D	Arcadia	Do
Caddo	W. J. Sandidge, M. D., C. P. H.	Shreveport	Do.
Caldwell	Thomas Burk, M. D	Columbia	Do.
Catahoula	L. C. Spencer, M. D	Harrisonburg	Do.
Claiborne	H. R. Marlatt, M. D., C. P. H.	Homer	Do.
Concordia	John Schreiber, M. D	Vidalia	Do.
De Soto	R. A. Tharp, M. D	Mansfield	Do.
East Carroll	B. J. Aymond, M. D	Lake Providence	Do.
Franklin	R. E. Applewhite, M. D	Winnsboro	Do.
Iberia	B. L. Stinson, M. D	New Iberia	Do.
Iberville	J. Cyril Eby, M. D	Plaquemine	Do.

[1] Parishes.

State and county	Name of health officer	Post office	Official title
Louisiana—Continued.			
Jefferson Davis	John M. Whitney, M. D.	Jennings	Director.
Lafayette	A. J Comeaux, M. D.	Lafayette	Do.
Lafourche	H. S. Smith, M. D.	Thibodaux	Do.
La Salle	E. L. Miller, M. D.	Jena	Do.
Lincoln	R. H. Allen, M. D.	Ruston	Do.
Madison	E S Freeman, M. D.	Tallulah	Do.
Morehouse	N. P. Liles, M. D.	Bastrop	Do.
Natchitoches	W. W Knipmeyer, M. D., C. P H.	Natchitoches	Do.
Ouachita	G D Williams, M D.	Monroe	Do.
Pointe Coupee	W. L Treuting, M. D.	New Roads	Do.
Rapides	P. F. Murphy, M. D.	Alexandria	Do.
Richland	R O C Green, M D.	Rayville	Do.
St Landry	F V Boyd, M D.	Opelousas	Do.
St. Martin	P. H Fleming, M. D.	St Martinville	Do.
St. Mary	F S Williams, M. D.	Franklin	Do.
Tensas	W. K Evans, M. D.	St. Joseph	Do.
Terrebonne	M F Houston, M D.	Houma	Do.
Union	J G. Norris, M. D.	Farmerville	Do
Washington	F. A Williams, M. D.	Franklinton	Do
Webster	W C Summer, M. D.	Minden	Do.
West Carroll	A. F. Whitsitt, M. D.	Oak Grove	Do.
Maine:			
Androscoggin	R J. Wiseman, Jr., M D.	Lewiston	Local health officer
Cumberland	Thomas Tetreau, M. D.	Portland	Do.
Hancock	F. O. Alley, B. S	Bar Harbor	Do.
Kennebec	A. R Daviau, M. D.	Waterville	Do.
Oxford	T. S. Burr, M D.	Rumford	Do.
Penobscot	H. D. McNeil, M. D.	Bangor	Do.
York	W. H. Kelly, M. D.	Sanford	Do.
Cooperative Health Union [1]			
Franklin County.	B. L. Arms, M. D.	Farmington	Director.
Mothov Health Union [1]	H. L. Jackson, M. D.	Old Town	Local health officer.
Maryland:			
Allegany	J. P Franklin, M. D.	Cumberland	Deputy State health officer
	W. B. Johnson, M. D.	do	Assistant deputy State health officer
Anne Arundel	W. J. French, M. D.	Annapolis	Deputy State health officer.
Baltimore	J. S. Bowen, M D.	Towson	Do.
Calvert	I. N King, M. D.	Prince Frederick	Do.
Caroline	G E Waters, M D.	Denton	Do.
Carroll	W. C. Stone, M. D.	Westminster	Do.
Cecil	C. A. Kane, M. D.	Elkton	Do.
Charles	D. St. C Campbell, M. D.	La Plata	Do
Dorchester	E. A Jones, M. D.	Cambridge	Do.
Frederick	E. C Kefauver, M. D.	Frederick	Do.
Garrett	E C. Peck, M. D.	Oakland	Do.
Harford	T A. Callahan, M. D.	Bel Air	Do.
Howard	E R Davies, M. D.	Ellicott City	Do.
Kent	H. R. DuPuy, M. D.	Chestertown	Do.
Montgomery	V. L. Ellicott, M. D, D. P. H.	Rockville	Do.
Prince Georges	A. B Hooton, M. D.	Upper Marlboro	Do.
Queen Annes	J. A. McCallum, M. D.	Centerville	Do.
St Marys	Temporary vacancy		Do.
Somerset	R. H Johnson, M. D.	Princess Anne	Do.
Talbot	L S. Welty, M. D.	Easton	Do.
Washington	W. R Cameron, M. D.	Hagerstown	Do.
Wicomico	S. H. Hurdle, M. D.	Salisbury	Do.
Worcester	Bradford Massey, M. D.	Pocomoke City	Do.
Massachusetts:			
Barnstable	Almon P. Goff, M. D.	Hyannis	County health officer.
Berkshire [1]	Harold W. Stevens, M. D.	Great Barrington	Medical director.
Franklin	Walter W. Lee, M. D.	Greenfield	Health officer.
Nashoba [1]	James O. Wails, M. D., C. P. H.	Ayer	Director of public health.
Michigan:			
Allegan	M. B. Beckett, M. D., C. P. H.	Allegan	Director.
Barry	R. B. Harkness, M. D.	Hastings	Do.
Branch	S F. Leeder, M. D., D. P. H.	Coldwater	Do.
Calhoun	M. R Kinde, M. D.	Marshall	Do.
Chippewa	David Littlejohn, M. D., D. P. H.	Sault Ste. Marie	Do.
Delta	R C. Farrier, M. D.	Escanaba	Do.
Eaton	J. W. Davis, M. D.	Charlotte	Do.
Genesee	T. E. Gibson, M. D., M. P. H.	Flint	Do.

[1] District.

State and county	Name of health officer	Post office	Official title
Michigan—Continued.			
Hillsdale	E. G. McGavran, M. D., C. P. H.	Hillsdale	Director.
Houghton-Keweenaw	F. J. Austin, M. D	Houghton	Do.
Iron	T. E Camper, M. D	Stambaugh	Do.
Isabella	F. R. Town, M. D	Mt Pleasant	Do.
Kent	J. D. Brook, M. D	Grand Rapids	Do.
Mecosta-Osceola	M C. Igloe, M. D	Big Rapids	Do.
Menominee	L. A. Borg, M. D	Menominee	Do
Midland	L. V. Burkett, M. D	Midland	Do.
Oakland	J. D Monroe, M. D	Pontiac	Do.
Ottawa	Ralph TenHave, M. D., C. P. H	Grand Haven	Do.
Saginaw	V. K. Volk, M. D., D. P H	Saginaw	Do.
Van Buren	Frank Carroll, M. D., D M. D , C. P H.	Paw Paw	Do
Wexford	S C. Moore, M. D	Cadillac	Do.
District No 1	T. R. Laughbaum, M. D	Lake City	Do.
Crawford.			
Kalkaska.			
Missaukee			
Roscommon.			
District No 2	Sue Thompson, M. D	West Branch	Do.
Alcona.			
Iosco.			
Ogemaw.			
Oscoda.			
District No. 3	Carleton Dean, M. D., C. P. H.	Charlevoix	Do.
Antrim.			
Charlevoix.			
Emmet.			
Otsego.			
District No. 4	G. B. Moffatt, M. D., D. P. H	Rogers City	Do.
Alpena.			
Cheboygan.			
Montmorency.			
Presque Isle.			
District No. 5	Guy R. Post, M. D., C. P. H	White Cloud	Do.
Lake.			
Newaygo.			
Oceana.			
District No. 6	C. D. Hart, M. D., C. P. H	Newberry	Do.
Luce			
Mackinac.			
Schoolcraft			
District No. 7	E. V. Thiehoff, M. D	Gladwin	Do.
Arenac.			
Clare			
Gladwin.			
District No. 8	L. W. Switzer, M. D	Manistee	Do.
Manistee.			
Mason.			
Minnesota:			
District No. 1	James R. Kingston, M. D	Bemidji	District health officer.
Beltrami.			
Hubbard.			
Itasca.			
Koochiching.			
District No 2	Floyd M. Feldman, M. D., D P. H.	Mankato	Do.
Blue Earth.			
Freeborn.			
Jackson.			
Martin.			
Mower			
District No. 3	Proposed		
District No. 4	C. A. Scherer, M. D	Duluth	Do.
Carlton.			
Cook.			
St. Louis.			
Chippewa Indian Health Unit.[2]	Percy T. Watson, M. D., M. P. H.	Cass Lake	Medical director.
Mississippi:			
Adams	C. R. Gillespie, M. D	Natchez	Director.
Bolivar	R. D. Dedwylder, M. D	Cleveland	Do.
Coahoma	N. C. Knight, M. D., C. P. H.	Clarksdale	Do.
Copiah	J. C. McGuire, M. D	Hazlehurst	Do.
Forrest	B. D. Blackwelder, M. D., C. P. H.	Hattiesburg	Do.
Hancock	C. M. Shipp, M. D	Bay St. Louis	Do.
[illegible]	[illegible] Williams M D	Gulfport	Do.

[1] District.
[2] Serving Indian population of northern part of the State.

State and county	Name of health officer	Post office	Official title
Mississippi—Contd.			
Hinds	W. E. Noblin, M. D	Jackson	Director.
Holmes	G W. Mast, M. D	Lexington	Do.
Humphreys	J. W. Barkley, M. D	Belzoni	Do.
Jackson	R. G. Lander, M. D	Pascagoula	Do.
Jones	A. R. Perry, M. D., M. P. H	Laurel	Do.
Lamar	J. N. Mason, M. D	Purvis	Do.
Lauderdale	D. V. Galloway, M. D., M. P. H.	Meridian	Do.
Lee	W. H. Cleveland, M. D	Tupelo	Do.
Leflore	L A. Barnett, M. D	Greenwood	Do.
Lincoln	W. R May, M. D., C. P. H	Brookhaven	Do.
Madison	C C Smith, M. D., C P. H	Canton	Do.
Marshall	V. B. Harrison, M. D., C. P.H	Holly Springs	Do.
Monroe	C H. Love, M. D	Aberdeen	Do.
Pearl River	R. J Jones, M D	Poplarville	Do.
Pike	T Paul Haney, Jr., M. D., C P H.	McComb	Do.
Sharkey	A. K Barrier, M D	Rolling Fork	Do.
Sunflower	H B Cottrell, M D , C. P. H	Indianola	Do.
Union	Ray H Biggs, M. D	New Albany	Do.
Warren	F Michael Smith, M. D	Vicksburg	Do.
Washington	John W. Shackelford, M. D., M. P H.	Greenville	Do.
Yazoo	H L McCalip, M. D., C. P H.	Yazoo City	Do.
Missouri			
Dunklin	Wheeler Davis, M. D	Kennett	County health officer.
Greene	L M. Garner, M D., C. P. H	Springfield	Do.
Marion	E M Lucke, M D	Hannibal	Do.
Miller	R L Russell, M D	Tuscumbia	Do
St. Louis	T. R Meyer, M. D , D. P. H	Clayton	Do.
Montana:			
Cascade	F L. Watkins, M. D	Great Falls	Do.
Missoula	F. D. Pease, M D	Missoula	Do.
Gallatin	F D Brewer, M D	Bozeman	Do.
New Mexico			
District No 1	E F. McIntyre, M. D	Santa Fe	District health officer.
Rio Arriba Santa Fe. Taos	A. A Wolfson, M. D , serving ad interim; Dr. McIntyre is on study leave.	do	Deputy district health officer.
District No 2 McKinley. San Juan.	E. B. Beaver, M. D	Gallup	District health officer.
District No 3	J O Long, M D	Albuquerque	Do.
Bernalillo. Sandoval	J. W. Elder, M. D., serving ad interim, Dr. Long is on study leave.	do	Deputy district health officer.
District No. 4 Dona Ana. Lincoln. Otero. Sierra.	C. W. Gerber, M. D	Las Cruces	District health officer
District No. 5 Guadalupe. Mora San Miguel.	W. W. Johnston, M. D	Las Vegas	Do.
District No. 6 Chaves. Eddy. Lea.	O. E. Puckett, M. D	Carlsbad	Do.
District No. 7 Grant. Hidalgo. Luna	J. C. Mitchell, M. D., C.P.H	Silver City	Do.
District No. 8 Catron. Socorro. Torrance. Valencia.	Harrison Eilers, M. D	Los Lunas	Do.
District No. 9 Colfax Harding. Union.	Frank C. Diver, M. D	Raton	Do.
District No. 10	Frank W. Parker, Jr., M. D	Clovis	Do.
Curry. DeBaca. Quay. Roosevelt.	R. P. Kandle, M. D., serving ad interim; Dr. Parker is on study leave.	do	Deputy district health officer.
New York:			
Cattaraugus	H. R. O'Brien, M D., C. P. H	Olean	County health commissioner.
Columbia	L. Van Hoesen, M. D	Hudson	Do.
Cortland	M. R. French, M. D., C. P. H	Cortland	Do.
Suffolk	A. T. Davis, M. D	Riverhead	Do.
Westchester	M. Nicoll, Jr., M. D	White Plains	Do.

State and county	Name of health officer	Post office	Official title
New York—Continued.			
Albany District	D. M. Griswold, M. D., D. P. H.	Albany	District health officer.
Albany.			
Greene			
Rensselaer.			
Schenectady.			
Amsterdam District	J. E. Perkins, M. D., D. P. H.	Amsterdam	Do.
Fulton.			
Montgomery.			
Binghamton District	H. L. Chant, M. D., C. P. H.	Binghamton	Do.
Broome			
Chenango.			
Tioga.			
Buffalo District	A. S. Dean, M. D., D. P. H.	Buffalo	Do.
Chautauqua.			
Erie.			
Genesee.			
Niagara.			
Orleans.			
Wyoming.			
Glens Falls District	B. Diefendorf, M. D	Glens Falls	Do.
Saratoga.			
Warren			
Washington			
Gouverneur District	S. W. Sayer, M. D	Gouverneur	Do.
Jefferson			
Lewis.			
St Lawrence.			
Hornell District	J. A. Conway, M D	Hornell	Do.
Allegany			
Chemung			
Steuben.			
Ithaca District	V. A. VanVolkenburgh, M. D., D. P H.	Ithaca	Do
Schuyler			
Tompkins			
Middletown District	F. W. Laidlaw, M. D	Middletown	Do
Orange			
Rockland.			
Sullivan.			
Ulster.			
New York City District.	M. D. Dickinson, M D	New York City	Do.
Nassau			
Oneonta District	R D. Champlin, M. D., C. P. H.	Oneonta	Do.
Delaware			
Otsego.			
Schoharie.			
Oswego District	C. R. Hervey, M. D	Oswego	Do
Oswego.			
Wayne.			
Poughkeepsie District	B. E. Roberts, M. D	Poughkeepsie	Do.
Dutchess.			
Putnam.			
Rochester District	E. L. Stebbins, M. D., C. P. H.	Rochester	Do.
Livingston.			
Monroe.			
Ontario.			
Yates.			
Saranac Lake District	A. H. Cummings, M. D., C. P. H.	Saranac Lake	Do.
Clinton.			
Essex.			
Franklin.			
Hamilton.			
Syracuse District	P. J. Rafle, M. D., C. P. H.	Syracuse	Do.
Cayuga.			
Onondaga.			
Seneca.			
Utica District	H. J. Ball, M. D	Utica	Do.
Herkimer.			
Madison.			
Oneida.			
North Carolina:			
Beaufort	David Emerson Ford, M. D.	Washington	County health officer.
Bertie	Frank H. Garriss, M. D	Windsor	Do.
Bladen	Robert S. Cromartie	Elizabethtown	Do.
Buncombe	Howard L. Sumner, M. D	Asheville	Do.
Cabarrus	Daniel G. Caldwell, M. D	Concord	Do.
Columbus	Floyd Johnson, M. D	Whiteville	Do.
Craven	John S. Anderson, M. D	New Bern	Do.
Cumberland	Malcolm Tennyson Foster, M. D.	Fayetteville	Do.
Davidson	Grover Cleveland Gambrell, M. D.	Lexington	Do.
Duplin	Ransom Lee Carr, M. D	Kenansville	Do.

State and county	Name of health officer	Post office	Official title
North Carolina—Con.			
Durham	J. H. Epperson, M. S	Durham	County health officer.
Edgecombe	Lorenzo Lynn Parks, M. D	Tarboro	Do.
Franklin	Richard F. Yarborough, M. D	Louisburg	Do.
Gaston	Robert Edgar Rhyne, M. D	Gastonia	Do.
Granville	Joseph A. Morris, M. D	Oxford	Do.
Guilford	Roderick Mark Buie, M. D	Greensboro	Do.
Halifax	Robort Sherwood McGeachy, M. D	Weldon	Do.
Harnett	William Blair Hunter, M. D	Lillington	Do.
Hertford	Thomas G. Faison, M. D	Winton	Do.
Lenoir	Zebulon Vance Moseley, M. D	Kinston	Do.
Mecklenburg	Edgar Hall Hand, M D	Charlotte	Do.
Moore	John Symington, M. D	Carthage	Do.
New Hanover	Avon Hall Elliot, M. D	Wilmington	Do.
Northampton	Marion Henry Seawell, M. D	Jackson	Do.
Pitt	N. Thomas Ennett, M. D	Greenville	Do.
Randolph	George Herbert Sumner, M D	Asheboro	Do.
Richmond	Robert Malcolm Bardin, M. D.	Rockingham	Do.
Robeson	Eugene Ramsey Hardin, M. D.	Lumberton	Do.
Rowan	Charles W. Armstrong, M. D	Salisbury	Do.
Rutherford	Howard C. Whims, M. D	Rutherfordton	Do.
Sampson	Wyman Plato Starling, M. D	Clinton	Do.
Surry	Ralph J. Sykes, M. D	Mount Airy	Do.
Vance	Alfred D. Gregg, M D	Henderson	Do.
Wake	Alexander C Bulla, M. D	Raleigh	Do.
Wayne	Samuel B. McPheeters, M. D	Goldsboro	Do.
Wilkes	Albert J. Eller, M. D	Wilkesboro	Do.
Wilson	Wade Hampton Anderson, M. D.	Wilson	Do.
Districts.			
Avery - Watauga - Yancey.	Clarence Hunt White, M. D	Burnsville	District health officer.
	Robert R. King, M. D	Boone	Assistant district health officer.
Forsyth - Stokes - Yadkin.	John Roy Hege, M. D	Winston-Salem	District health officer.
Haywood-Jackson-Swain-Macon-Graham.	Crete Nixon Sisk, M. D	Waynesville	Do.
	Zack Perry Mitchell, M. D	Bryson City	Assistant district health officer.
	Harry Miller, M. D	Franklin	Do
Orange-Person	William P. Richardson, M. D.	Chapel Hill	District health officer
	Sigma Van Lewis, M. D	Roxboro	Assistant district health officer.
Ohio:			
Athens	J. M. Higgins, M D	Athens	Health commissioner.
Belmont	A. J. Martin, M. D	St Clairsville	Do.
Brown	W. L Faul, M. D	Georgetown	Do
Butler	C. J. Baldridge, M. D	Hamilton	Do
Clermont	J. A. Carter, M. D	Batavia	Do.
Clinton	W K. Ruble, M. D	Wilmington	Do.
Crawford	G. T. Wasson, M. D	Bucyrus	Do.
Cuyahoga	Robert Lockhart, M. D	Cleveland	Do.
Darke	W. D. Bishop, M D	Greenville	Do.
Delaware	B. B. Barber, M. D	Delaware	Do.
Erie	F. M. Houghtaling, M D	Sandusky	Do.
Fairfield	W R. Coleman, M D	Lancaster	Do.
Fayette	James F. Wilson, M. D	Washington C. H	Do
Greene	G E Savage, M. D	Xenia	Do.
Guernsey	D L Cowden, M. D	Cambridge	Do.
Hamilton	E. H Schoenling, M. D	Cincinnati	Do.
Hancock	S F. Whisler, M. D	Findlay	Do.
Hocking	W B. Lacock, M. D	Logan	Do.
Huron	B. C. Pilkey, M. D	Norwalk	Do.
Jefferson	J. P. Young, M D	Steubenville	Do.
Lorain	F R Dew, M D	Oberlin	Do.
Lucas	T. W. Mahoney, M. D	Toledo	Do.
Madison	Robert Trimble, M. D	London	Do.
Mahoning	G. Y. Davis, M. D	Youngstown	Do.
Marion	N. Sifritt, M. D	Marion	Do.
Medina	V L. Hartman, M. D	Medina	Do.
Meigs	W. S. Ellis, M. D	Pomeroy	Do.
Mercer	F. E. Ayers, M. D	Celina	Do.
Miami	E. R. Hiatt, M. D	Troy	Do.
Montgomery	H. H. Pansing, M. D	Dayton	Do.
Morrow	R. L. Pierce, M. D	Mt Gilead	Do.
Muskingum	Beatrice Hagen, M. D	Zanesville	Do.
Perry	F. J. Crosbie, M. D	New Lexington	Do.
Pickaway	V. D. Kerns, M. D	Circleville	Do.
Preble	J. I. Nisbet, M. D	Eaton	Do.

State and county	Name of health officer	Post office	Official title
Ohio—Continued.			
Richland	M. C. Hanson, M. D.	Mansfield	Health commissioner.
Ross	R. E. Bower, M. D.	Chillicothe	Do.
Seneca	D. W. Fellers, M. D.	Tiffin	Do.
Shelby	Paul C. Bratten, M. D.	Sidney	Do.
Stark	Floyd R. Stamp, M. D.	Canton	Do.
Summit	R. H. Markwith, M. D.	Akron	Do.
Trumbull	L. A. Connell, M. D.	Warren	Do.
Union	H. G. Southard, M. D.	Marysville	Do.
Vinton	W. B. Lacock, M. D.	McArthur	Do.
Washington	Alfred G. Sturgiss, M. D.	Marietta	Do.
Wayne	J. J. Sutter, M. D.	Wooster	Do.
Wood	H. J. Powell, M. D.	Bowling Green	Do.
Wyandot	L. W. Naus, M. D.	Upper Sandusky	Do.
Oklahoma:			
Carter	R. M. Parish, M. D.	Ardmore	Director.
Cleveland	Guy H. Williams, M. D.	Norman	Do.
Kingfisher	A. O. Meredith, M. D.	Kingfisher	Do.
Le Flore	R. L. Wright, M. D.	Poteau	Do.
McCurtain	R. D. Williams, M. D.	Idabel	Do.
Oklahoma	Albert Cates, M. D.	Oklahoma City	Do.
Payne	J. F. Hackler, M. D.	Stillwater	Do.
Pittsburg	Ernest Thomas, M. D.	McAlester	Do.
Seminole	George Hunter, M. D.	Seminole	Do.
District No. 1 Adair Cherokee. Delaware. Mayes Sequoyah.	Grady F. Matthews, M. D.	Tahlequah	Do.
District No. 2 Beaver. Cimarron. Harper. Texas.	Johnny A. Blue, M. D.	Guymon	Do.
Oregon:			
Clackamas	Courtney Smith, M. D.	Oregon City	County health officer.
Douglas	J. E. Campbell, M. D.	Roseburg	Do.
Jackson	C. I. Drummond, M. D.	Medford	Do
Josephine	S. L. Osgood, M. D.	Grants Pass	Do.
Klamath	Ned Black, M. D.	Klamath Falls	Do.
Lane	E. L. Gardner, M. D.	Eugene	Do.
Marion	Vernon Douglass, M. D.	Salem	Do.
Multnomah	Harry R. Cliff, M. D.	Portland	Do.
Washington	D. C. McDonald, M. D.	Hillsboro	Do.
Rhode Island:			
Districts:			
Bristol-Newport	Joseph Castronovo, M. D.	Bristol	District health officer.
South	Raymond F. McAteer, M. D.	Peace Dale	Do.
Woonsocket-Kent	James P. O'Brien, M. D.	Woonsocket	Do
South Carolina:			
Aiken	J. T. Hair, M. D.	Aiken	Health director.
Anderson	Goodman Baro, M. D.	Anderson	Do.
Beaufort	C. T. Larisey, M. D.	Beaufort	Do.
Berkeley	W. K. Fishburne, M. D.	Moncks Corner	Do.
Charleston	Leon Banov, M. D.	Charleston	Do.
Cherokee	G. R. Westrope, M. D.	Gaffney	Do.
Colleton	C. L. Guyton, M. D.	Walterboro	Do.
Darlington	W. A. Carrigan, M. D.	Darlington	Do.
Dorchester	B. M. Montgomery, M. D.	St. George	Do.
Fairfield	J. L. Bryson, M. D.	Winnsboro	Do.
Florence	J. R. Claussen, M. D.	Florence	Do.
Greenville	Baylis Earle, M. D.	Greenville	Do.
Greenwood	J. E. Brodie, M. D.	Greenwood	Do.
Horry	P. H. Edwards, M. D.	Conway	Do.
Kershaw	A. W. Humphries, M. D.	Camden	Do.
Marlboro	J. Y. O'Daniel, M. D.	Bennettsville	Do.
Newberry	Clause Sease, M. D.	Newberry	Do.
Oconee	W. B. Furman, M. D.	Pickens	Do.
Orangeburg	G. C. Bolin, M. D.	Orangeburg	Do.
Pickens	W. B. Furman, M. D.	Pickens	Do.
Richland	E. P. White, M. D.	Columbia	Do.
Spartanburg	J. M. Beeler, M. D.	Spartanburg	Do.
Districts:			
Abbeville-Laurens-Union.	R. M. Street, M. D.	Laurens	Do
Allendale-Bamberg-Barnwell.	L. T. Claytor, M. D.	Barnwell	Do.
Calhoun-Lexington	F. L. Geiger, M. D.	St. Matthews	Do.
Chester-York	W. B. Jones, M. D.	Chester	Do.
Chesterfield - Lancaster.	A. J. Cauthen, M. D.	Lancaster	Do.

State and county	Name of health officer	Post office	Official title
South Carolina—Con.			
Districts—Continued.			
Clarendon - Lee - Sumter.	G. H. Zerbst, M. D	Sumter	Health director.
Dillon-Marion	C. A. Henderson, M. D	Dillon	Do.
Edgefield - McCormick-Saluda.	O. D. Garvin, M. D	Edgefield	Do.
Georgetown - Williamsburg.	J. H. Pearce, M. D	Georgetown	Do.
Hampton-Jasper	L. T. Claytor, M. D	Barnwell	Do.
	C. T. Larisey, M. D	Ridgeland	Do.
South Dakota:			
Charles Mix	P R. Pinard, M. D	Wagner	Director.
Hutchinson	R. H. Payne, M. D	Tripp	Do.
Union	Wm F Bushnell, M. D	Elk Point	Do.
District	K. W Navin, M. D	Philip	Do.
Bennett			
Haakon.			
Jones.			
Washabaugh.			
Tennessee:			
Blount	A E. Hardison, M. D	Maryville	Do.
Bradley	W. Carey Sanford, M. D	Cleveland	Do.
Davidson	J. J. Lentz, M. D	Nashville	County health officer.
Gibson	F. L. Roberts, M. D., D. P. H.	Trenton	Director.
Giles	Joseph C. Tatum, M. D	Pulaski	Do
Greene	R S. Cowles, M. D	Greeneville	Do.
Grundy	U. B Bowden, M D	Pelham	Do.
Hamilton	J. C. Eldridge, M. D	Chattanooga	Do.
Hardeman	R. L. Cobb, M D	Bolivar	Do.
Hardin	J. W. Erwin, M. D	Savannah	Do.
Humphreys	R E Bilbrey, M. D	Waverly	Do.
Knox	A. G Hufstedler, M. D	Knoxville	Do.
Lake	J. P Moon, M. D	Tiptonville	Do.
Lauderdale	R. B. Griffin, M D	Ripley	Do.
Lincoln	M F Brown, M D	Fayetteville	Do.
Maury	H. C. Busby, M. D., C. P. H	Columbia	Do.
Monroe	David M. Cowgill, M. D., C. P H.	Madisonville	Do.
Montgomery	F. J. Malone, M. D	Clarksville	Do.
Obion	W. B. Harrison, M. D	Union City	Do.
Roane	J. C. Fly, M. D	Kingston	Do.
Rutherford	J. B. Black, M. D., C. P. H	Murfreesboro	Do.
Sevier	H. A. Sauberli, M. D	Sevierville	Do.
Shelby	W. P Moore, M D	Memphis	Do.
Sullivan	F L. Moore, M D , C. P. H	Blountville	Do.
Sumner	W. M. Dedman, M. D	Gallatin	Do.
Tipton	A. J. Butler, M. D	Covington	Do.
Washington	W. L. Poole, M. D., C. P. H	Jonesboro	Do.
Weakley	M D. Ingram, M. D	Dresden	Do.
Williamson	Don C. Peterson, M. D., C. P H	Franklin	Do.
Wilson	B. W. Patton, M. D	Lebanon	Do.
Districts:			
Anderson-Campbell	H. S. Rule, M. D	Clinton	Do.
Bledsoe-Sequatchie	H. M. Roberson, M. D	Pikeville	Do.
Carter-Unicoi	F. M. Foote, M. D., D. P. H	Elizabethton	Do.
Claiborne-Grainger-Hancock	A. B. Shipley, M. D	Tazewell	Do.
Jackson-Overton-Pickett-Fentress	F. B. Clark, M. D	Gainesboro	Assistant director.
Rhea-Meigs	E. N. Haller, M. D	Dayton	Do.
Texas:			
Bell	E. W. Prothro, M. D	Temple	Director.
Dallas	Horace E. Duncan, M. D., C. P H.	Dallas	Do.
El Paso-Hudspeth-Culberson.	J. W. Tappan, M. D	El Paso	Do.
Gregg	T. B. Wilson, M. D	Longview	Do.
Hidalgo	D. R. Handley, M. D	Edinburg	Do.
Limestone	W. B. Summers, M. D	Mexia	Do.
Nolan	Geo. A. Gray, M. D	Sweetwater	Do.
Potter	B. M. Primer, M. D., M. P. H.	Amarillo	Do.
Smith	A. E. Hill, M. D	Tyler	Do.
Tarrant	Burke Brewster, M. D	Fort Worth	Do.
Winkler	L. T. Cox, M. D	Kermit	Do.
Utah:			
Davis	Sumner Gleason, M. D	Kaysville	Do.
Virginia:			
Albemarle	Robert D. Hollowell, M. D., C. P. H.	Charlottesville	Health officer.
Alleghany-Rockbridge.	Robert P. Cooke, M. D	Lexington	Do.
	James T. Duncan, M. D	do	Assistant health officer.

State and county	Name of health officer	Post office	Official title
Virginia—Continued.			
Arlington	Temporary vacancy [1]	Arlington	
	John D. Hamner, Jr, M. D.	do	Assistant health officer.
Augusta	John C. Neale, Jr, M. D., C. P. H.	Staunton	Health officer.
	Hugh M. Wallace, M. D.	do	Assistant health officer.
Brunswick-Greensville-Mecklenburg.	Thomas H. Valentine, M. D.	Lawrenceville	Health officer.
Buchanan-Russell-Tazewell	Charles L. Savage, M. D.	Richlands	Do.
Buckingham-Nottoway-Prince Edward.	William A. Brumfield, M. D.	Farmville	Do.
Dickenson-Lee-Wise	John R. Massie, M. D.	Norton	Do.
Fairfax	Edward M. Holmes, Jr., M. D., C. P. H.	Fairfax	Do.
Halifax	Daniel C. Steelsmith, M. D., C. P. H.	South Boston	Do.
Hanover	Linwood Farley, M. D.	Ashland	Do.
Henrico	Temporary vacancy		
Isle of Wight-Nansemond.	R. Campbell Manson, M. D.	Suffolk	Acting health officer.
Montgomery	Sheldon D. Carey, M. D.	Christiansburg	Health officer
Norfolk-Princess Anne.	Josiah Leake, M. D.	Portsmouth	Do.
Northampton	Hugh B. Magill, Jr, M. D.	Eastville	Do
Pittsylvania	William H. Walcott, M. D.	Chatham	Do
Pulaski	Harold M. Kelso, M. D.	Pulaski	Do
Southampton	Peter P. Causey, M. D.	Courtland	Do
Sussex	John H. Bonner, M. D.	Stony Creek	Do.
Washington	Mack I. Shanholtz, M. D.	Bristol	Do
Wythe	Joseph L. Hundley, M. D.	Wytheville	Do
Peninsula Health District: Elizabeth City. James City. Warwick. York.	Jack B. Porterfield, M. D.	Williamsburg	Do.
Valley Health District: Greene. Madison. Page. Rappahannock. Rockingham. Shenandoah. Warren.	Shockley D. Gardner, M. D.	Luray	Do.
Washington:			
Chelan	C. R. Fargher, M. D.	Wenatchee	County health officer.
Clallam	Leland Powers, M. D.	Port Angeles	Do.
Clark	J. A. Kahl, M. D.	Vancouver	Do.
King	Wallace D. Hunt, M. D.	Seattle	Do.
Spokane	A. E. Lien, M. D.	Spokane	Do.
Thurston	Sanford Lehman, M. D.	Olympia	Do.
Yakima	Lloyd Moffitt, M. D.	Yakima	Do.
West Virginia.			
Berkeley	C. A. Thomas, M. D.	Martinsburg	Health officer.
Boone	R. L. Hunter, M. D.	Madison	Do.
Brooke	W. T. Booher, M. D.	Wellsburg	Do.
Fayette	C. E. Watkins, M. D.	Fayetteville	Do.
Hancock	Thomas H. Bruce, M. D.	New Cumberland	Acting health officer.
Harrison	A. J. Kemper, M. D.	Clarksburg	Health officer.
Kanawha	Leo Mynes, M. D.	Charleston	Acting health officer.
Logan	T. J. Farley, M. D.	Logan	Health officer.
Marshall	W. G. C. Hill, M. D.	Moundsville	Do
Monongalia	Rex A. Burdette, M. D.	Morgantown	Do.
Ohio	Reece M. Pedicord, M. D.	Wheeling	City-county health officer
Preston	C. Y. Moser, M. D.	Kingwood	Health officer.
Raleigh	W. W. Hume, M. D.	Beckley	Do.
Wood	A. D. Knott, D. P. H.	Parkersburg	Do.
Wetzel	Edwin Cameron, M. D.	New Martinsville	Do.
Wisconsin:			
Dane	E. F. Hoffman, M. D.	Madison	Medical director, county sanitary unit.
Marathon	H. H. Fechtner, M. D.	Wausau	Do.
District No. 1: Columbia. Crawford. Grant. Green. Iowa. LaFayette. Richland. Sauk.	G. W. Henika, M. D.	Madison	District health officer.

[1] Dr. Earle G. Brown appointed health officer in April 1937.

State and county	Name of health officer	Post office	Official title
Wisconsin—Continued			
District No. 2	George E. Hoyt, M. D	Elkhorn	District health office.
Jefferson.			
Kenosha			
Milwaukee.			
Racine.			
Rock.			
Walworth.			
Waukesha			
District No. 3	V. A. Gudex, M. D	Fond du Lac	Do.
Calumet.			
Dodge.			
Fond du Lac.			
Manitowoc.			
Ozaukee			
Sheboygan.			
Washington.			
Winnebago.			
District No. 4	E. H. Jorris, M. D	Mauston	Do.
Adams.			
Green Lake.			
Juneau			
La Crosse.			
Marquette.			
Monroe.			
Vernon.			
Waushara.			
District No. 5	L. M. Morse, M. D	Neillsville	Do.
Buffalo			
Clark			
Jackson.			
Pepin			
Portage.			
Trempeleau.			
Wood.			
District No. 6	Allan Filek, M. D	Green Bay	Do.
Brown.			
Door.			
Kewaunee.			
Marinette.			
Oconto.			
Outagamie.			
Shawano.			
Waupaca.			
District No. 7	F. P. Daly, M D	Chippewa Falls	Do.
Barron.			
Chippewa.			
Dunn.			
Pierce.			
Polk			
Rusk.			
St. Croix.			
District No. 8	R. L. Frisbie, M. D	Rhinelander	Do.
Florence.			
Forest.			
Langlade.			
Lincoln			
Oneida.			
Price			
Taylor.			
Vilas.			
District No. 9	John W. Lowe, M. D	Ashland	Do.
Ashland.			
Bayfield.			
Burnett.			
Douglas.			
Iron.			
Sawyer.			
Washburn.			

DEATHS DURING WEEK ENDED OCT. 30, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Oct. 30, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	8,129	7,938
Average for 3 prior years	7,807	
Total deaths, first 43 weeks of year	370,830	870,255
Deaths under 1 year of age	510	521
Average for 3 prior years	550	
Deaths under 1 year of age, first 43 weeks of year	23,828	23,946
Data from industrial insurance companies		
Policies in force	69,848,865	68,485,845
Number of death claims	12,266	11,908
Death claims per 1,000 policies in force, annual rate	9.2	9.1
Death claims per 1,000 policies, first 43 weeks of year, annual rate	9.8	9.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (......) indicate that cases or deaths may have occurred, although none was reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 6, 1937, and Nov. 7, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 6, 1937	Week ended Nov. 7, 1936	Week ended Nov. 6, 1937	Week ended Nov. 7, 1936	Week ended Nov. 6, 1937	Week ended Nov. 7, 1936	Week ended Nov. 6, 1937	Week ended Nov. 7, 1936
New England States:								
Maine	1	4	8	......	37	12	0	0
New Hampshire	......	......	......	......	45	3	0	0
Vermont	......	......	......	......	39	1	0	0
Massachusetts	3	2	......	......	59	60	0	2
Rhode Island	3	......	......	......	2	155	0	0
Connecticut	4	3	1	8	4	36	0	0
Middle Atlantic States:								
New York	28	22	[1] 16	[1] 8	77	139	7	9
New Jersey	11	16	15	18	155	48	0	2
Pennsylvania	34	28	......	......	675	18	6	6
East North Central States:								
Ohio	48	28	2	6	160	10	8	2
Indiana	42	14	36	10	10	7	1	1
Illinois	41	32	15	13	300	14	2	3
Michigan	22	15	......	1	50	15	1	3
Wisconsin	2	5	27	24	32	16	0	0
West North Central States:								
Minnesota	12	48	......	1	3	19	0	0
Iowa	5	11	......	1	2	......	0	0
Missouri	39	20	17	49	293	2	3	2
North Dakota	4	1	......	......	......	......	1	0
South Dakota	3	......	......	......	......	1	0	0
Nebraska	7	......	13	......	1	1	0	0
Kansas	14	21	6	......	22	8	4	0
South Atlantic States:								
Delaware	1	1	......	......	......	3	0	1
Maryland [2]	10	14	1	8	6	10	1	4
District of Columbia	5	15	......	8	8	5	1	5
Virginia	63	54	......	......	28	8	8	8
West Virginia	47	51	8	16	15	10	3	0
North Carolina [3]	117	163	......	5	174	7	6	8
South Carolina [3]	16	22	163	194	87	......	0	0
Georgia [3]	42	44	......	......	......	......	1	0
Florida [3] [4]	46	12	10	......	22	......	0	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 6, 1937, and Nov. 7, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 6, 1937	Week ended Nov. 7, 1936	Week ended Nov. 6, 1937	Week ended Nov. 7, 1936	Week ended Nov. 6, 1937	Week ended Nov. 7, 1936	Week ended Nov. 6, 1937	Week ended Nov. 7, 1936
East South Central States:								
Kentucky	33	31	9	10	29	36	4	6
Tennessee	21	36	66	80	72	1	2	3
Alabama [3]	41	55	91	52	5		3	0
Mississippi [2, 3]	20	17					0	1
West South Central States:								
Arkansas	31	8	26	17	4		1	0
Louisiana	27	29	5	36	1	2	0	1
Oklahoma [5]	38	8	22	46	1		1	2
Texas [3]	58	36	203	60	18	22	0	1
Mountain States:								
Montana			3	11	13	1	1	0
Idaho	2	2	2	3	2	56	0	0
Wyoming		2			1	5	0	1
Colorado	3	8			31	1	0	0
New Mexico	4	2			29	4	0	0
Arizona	2	2	36	43		38	0	0
Utah [2]	105	1			17	12	1	3
Pacific States:								
Washington	1	4		3	25	24	0	1
Oregon	5	1	29	19	9	1	0	0
California	24	53	22	27	39	22	1	2
Total	1,085	941	847	717	2,547	828	62	67
First 44 weeks of year	21,661	22,185	280,241	145,119	253,534	272,132	4,794	6,546

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Nov. 6, 1937	Week ended Nov. 7, 1936	Week ended Nov. 6, 1937	Week ended Nov. 7, 1936	Week ended Nov. 6, 1937	Week ended Nov. 7, 1936	Week ended Nov. 6, 1937	Week ended Nov. 7, 1936	Week ended Nov. 6, 1937
New England States:									
Maine	1	0	11	17	0	0	4	3	78
New Hampshire	0	0	6	11	0	0	0	0	11
Vermont	0	0	9	4	0	0	0	0	15
Massachusetts	1	0	129	123	0	0	4	4	91
Rhode Island	0	0	15	12	0	0	1	0	23
Connecticut	5	0	39	50	0	0	0	0	29
Middle Atlantic States:									
New York	10	6	241	321	0	0	12	14	318
New Jersey	6	1	61	39	0	0	4	4	80
Pennsylvania	3	7	337	213	0	0	15	20	
East North Central States:									
Ohio	2	9	316	251	0	0	15	27	142
Indiana	2	3	152	71	11	3	10	1	27
Illinois	18	25	325	274	16	1	16	23	88
Michigan	1	4	296	190	1	1	4	14	
Wisconsin	7	1	119	210	6	2	1	2	182
West North Central States.									
Minnesota	10	1	101	99	3	1	0	0	49
Iowa	15	3	129	66	31	6	1	5	59
Missouri	3	5	242	61	7	0	12	7	81
North Dakota	1	0	42	43	60	5	2	2	31
South Dakota	1	1	21	31	7	0	1	2	19
Nebraska	7	1	34	3	0	0	2	0	17
Kansas	2	6	120	121	2	2	2	6	38
South Atlantic States:									
Delaware	0	0	6	3	0	0	2	3	2
Maryland [3]	0	1	68	66	0	0	10	8	65
District of Columbia	0	0	10	6	0	0	1	1	3
Virginia	1	2	52	53	0	0	9	19	59
West Virginia	0	6	107	78	0	0	9	7	32

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 6, 1937, and Nov. 7, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Nov. 6, 1937	Week ended Nov. 7, 1936	Week ended Nov. 6, 1937	Week ended Nov 7, 1936	Week ended Nov. 6, 1937	Week ended Nov. 7, 1936	Week ended Nov. 6, 1937	Week ended Nov. 7, 1936	Week ended Nov. 6, 1937
South Atlantic States—Con.									
North Carolina [3]	2	1	77	81	0	0	24	4	120
South Carolina [3]	0	0	2	27	0	0	2	2	32
Georgia [3]	1	4	32	27	0	0	11	12	10
Florida [3] [4]	1	2	14	6	0	0	1	1	8
East South Central States:									
Kentucky	0	1	43	64	0	0	13	20	111
Tennessee	4	2	49	37	5	0	11	16	31
Alabama [3]	0	2	26	21	0	0	5	6	16
Mississippi [2] [3]	5	3	19	22	1	0	6	8	-------
West South Central States:									
Arkansas	1	8	24	8	1	0	16	4	13
Louisiana	4	0	11	16	0	0	7	8	10
Oklahoma [5]	2	31	81	15	1	7	16	18	32
Texas [3]	3	2	107	22	3	1	42	19	86
Mountain States:									
Montana	0	0	16	40	20	5	1	2	16
Idaho	0	0	24	38	4	0	1	2	2
Wyoming	0	0	8	32	10	3	2	0	18
Colorado	1	10	35	42	0	0	5	0	12
New Mexico	2	0	11	25	0	0	5	10	26
Arizona	0	1	6	6	0	0	2	1	-------
Utah [2]	1	0	51	22	1	1	1	0	17
Pacific States:									
Washington	1	2	17	28	6	0	3	4	52
Oregon	2	3	21	32	3	1	0	5	23
California	24	11	130	180	0	2	7	14	208
Total	150	165	3,792	3,207	190	41	318	328	2,377
First 44 weeks of year	9,003	3,894	187,431	198,785	8,861	6,368	13,609	12,920	-------

[1] New York City only.
[2] Week ended earlier than Saturday
[3] Typhus fever, week ended Nov 6, 1937, 38 cases, as follows. North Carolina, 1; South Carolina, 4; Georgia, 18; Florida, 1; Alabama, 4, Mississippi, 1; Texas, 9.
[4] Dengue, week ended Nov 6, 1937, Florida, 1 case
[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
June 1937										
Missouri	5	45	117	98	319	2	4	520	67	85
July 1937										
Maryland	10	24	4	-------	92	-------	8	43	0	62
North Dakota	2	1	5	-------	4	-------	0	24	87	8
August 1937										
Missouri	3	50	123	305	85	1	82	157	19	134
October 1937										
Connecticut	3	24	10	2	16	-------	28	128	0	7
Delaware	0	6	-------	-------	2	-------	0	29	0	1
District of Columbia	6	33	3	-------	8	1	5	38	0	6
Missouri	7	214	162	148	399	1	71	769	28	128

June 1937

Missouri:	Cases
Chicken pox	108
Dysentery	56
Encephalitis, epidemic or lethargic	1
Mumps	123
Rabies in animals	6
Septic sore throat	27
Trachoma	52
Tularaemia	5
Whooping cough	677

July 1937

Maryland:	
Chicken pox	38
Diarrhea	65
Dysentery (bacillary)	40
Encephalitis, epidemic or lethargic	2
German measles	8
Impetigo contagiosa	10
Lead poisoning	1
Mumps	42
Ophthalmia neonatorum	8
Paratyphoid fever	1
Rocky Mountain spotted fever	12
Septic sore throat	6
Tetanus	1
Typhus fever	3
Undulant fever	1
Whooping cough	592

July 1937—Continued

North Dakota:	Cases
Chicken pox	50
Mumps	1
Rocky Mountain spotted fever	1
Whooping cough	180

August 1937

Missouri:	
Chicken pox	15
Dysentery	71
Encephalitis	52
Mumps	24
Rabies in animals	6
Septic sore throat	35
Tetanus	1
Trachoma	17
Undulant fever	9
Whooping cough	257

October 1937

Chicken pox:	
Connecticut	156
Delaware	5
District of Columbia	12
Missouri	98
Dysentery	
Connecticut (bacillary)	25
Missouri	27
Encephalitis, epidemic or lethargic	
Connecticut	1
Missouri	34

October 1937—Continued

German measles:	Cases
Connecticut	10
Lead poisoning:	
Connecticut	2
Mumps:	
Connecticut	153
Delaware	48
Missouri	36
Ophthalmia neonatorum:	
Connecticut	3
Delaware	1
Paratyphoid fever:	
Connecticut	4
Rabies in animals:	
Missouri	13
Septic sore throat:	
Connecticut	14
Missouri	69
Tetanus:	
Connecticut	1
Trachoma:	
Missouri	63
Trichinosis:	
Connecticut	5
Tularaemia:	
Missouri	[illegible]
Undulant fever:	
Connecticut	5
Missouri	3
Whooping cough:	
Connecticut	75
Delaware	22
District of Columbia	19
Missouri	279

PLAGUE INFECTION IN FRESNO COUNTY, CALIF.

Under date of November 5, 1937, Dr. W. M. Dickie, Director of Public Health of California, reported plague infection proved by animal inoculation in a pool of 14 fleas taken from 46 golden mantled squirrels collected on September 30 in the Cedar Crest area, 2 miles west of Lake Shore, Huntington Lake, Fresno County, Calif.

WEEKY REPORTS FROM CITIES

City reports for week ended Oct. 30, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	300	141	32	223	479	946	7	355	53	786	
Current week	172	73	30	620	487	765	4	313	40	721	
Maine:											
Portland	0		0	0	2	0	0	0	0	10	19
New Hampshire:											
Concord	0		0	2	1	0	0	0	0	0	7
Manchester	1		0	0	1	0	0	0	0	0	17
Nashua	0		0	0	0	0	0	0	0	7	4
Vermont:											
Barre	0		0	18	0	0	0	0	2	0	1
Burlington	0		0	0	0	0	0	0	0	0	9
Rutland	0		0	7	0	1	0	0	0	1	7
Massachusetts:											
Boston	0		1	24	21	34	0	6	0	7	223
Fall River	0		0	0	0	0	0	0	0	16	24
Springfield	0		0	0	1	1	0	0	0	4	31
Worcester	0		0	0	4	3	0	2	0	8	52

City reports for week ended Oct. 30, 1937—**Continued**

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Rhode Island:											
Pawtucket	0	------	0	0	0	1	0	0	0	0	21
Providence	0	------	1	2	5	5	0	2	0	14	66
Connecticut:											
Bridgeport	1	1	0	0	3	3	0	1	1	0	33
Hartford	0	------	0	1	2	4	0	2	1	3	38
New Haven	0	------	0	0	1	1	0	0	0	1	28
New York:											
Buffalo	0	------	0	0	9	6	0	3	0	15	154
New York	29	7	3	25	102	49	0	66	2	101	1,309
Rochester	0	1	0	0	3	0	0	1	1	5	72
Syracuse	0	------	0	4	7	27	0	1	0	11	52
New Jersey:											
Camden	0	------	0	0	0	2	0	1	2	0	33
Newark	0	------	0	3	8	5	0	2	0	20	96
Trenton	0	------	0	84	5	0	0	1	0	2	23
Pennsylvania:											
Philadelphia	2	1	0	11	23	42	0	19	6	28	454
Pittsburgh	4	------	2	91	9	29	0	7	0	18	148
Reading	0	------	1	0	1	3	0	0	0	0	28
Scranton	0	------	--------	2	-------	0	0	-------	0	1	--------
Ohio:											
Cincinnati	4	------	1	0	3	5	0	9	1	8	129
Cleveland	1	3	0	51	16	25	0	6	0	18	192
Columbus	4	------	0	0	7	9	0	2	0	1	66
Toledo	0	1	0	3	5	15	0	3	1	6	70
Indiana:											
Anderson	0	------	0	0	0	6	0	0	0	1	13
Fort Wayne	0	------	0	0	4	2	0	0	0	0	22
Indianapolis	4	------	0	3	0	26	0	4	0	10	98
Muncie	1	------	0	0	0	2	0	0	0	0	11
South Bend	0	------	0	0	1	1	0	0	0	3	13
Terre Haute	1	------	0	0	0	0	0	0	0	0	20
Illinois:											
Alton	1	------	0	12	0	0	0	0	0	0	12
Chicago	12	------	4	65	47	84	0	42	1	32	702
Elgin	0	------	0	0	0	0	0	0	0	0	4
Moline	0	------	0	0	1	4	0	0	0	2	8
Springfield	0	------	0	0	1	2	0	0	1	3	25
Michigan:											
Detroit	12	1	0	25	15	66	0	13	1	22	247
Flint	4	------	0	2	2	10	1	0	0	5	25
Grand Rapids	0	------	0	1	1	19	0	0	0	6	34
Wisconsin:											
Kenosha	0	------	0	0	0	4	0	0	0	0	4
Madison	0	------	0	1	1	1	0	0	0	0	20
Milwaukee	1	------	0	17	2	8	0	0	0	44	104
Racine	0	------	0	0	0	5	0	0	0	1	9
Superior	0	------	0	0	0	6	0	0	0	0	5
Minnesota:											
Duluth	0	------	0	0	2	3	0	2	0	14	26
Minneapolis	1	------	1	2	3	25	0	2	0	14	107
St. Paul	1	------	0	2	5	5	0	0	1	5	62
Iowa:											
Cedar Rapids	0	------	--------	0	-------	0	0	-------	0	1	--------
Davenport	2	------	--------	0	-------	1	0	-------	0	0	--------
Des Moines	0	------	--------	0	-------	7	0	-------	0	2	34
Sioux City	0	------	--------	0	-------	2	0	-------	0	1	--------
Waterloo	0	------	--------	0	-------	3	0	-------	0	6	--------
Missouri:											
Kansas City	0	------	0	0	6	10	0	4	0	1	110
St. Joseph	0	------	0	0	5	4	0	2	0	1	31
St. Louis	17	------	2	140	5	34	1	3	3	6	209
North Dakota:											
Fargo	0	------	0	0	0	6	0	0	0	13	8
Grand Forks	0	------	--------	0	-------	8	0	-------	0	0	--------
Minot	0	------	0	0	0	1	0	0	0	1	2
South Dakota:											
Aberdeen	1	------	--------	0	-------	0	0	-------	0	0	--------
Sioux Falls	0	------	0	0	0	0	0	0	0	0	9
Nebraska:											
Omaha	0	------	1	1	4	1	0	0	0	1	51
Kansas:											
Lawrence	0	1	0	0	0	0	0	0	0	0	3
Topeka	0	------	1	0	1	2	0	0	0	2	28
Wichita	1	------	0	0	2	6	0	2	0	15	29

City reports for week ended Oct. 30, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Delaware:											
Wilmington	0		0	0	4	8	0	0	0	1	29
Maryland:											
Baltimore	7	4	1	8	18	14	0	13	2	59	214
Cumberland	0		0	0	1	1	0	0	0	1	12
Frederick	0		0	0	1	0	0	0	0	0	
District of Columbia:											
Washington	8		0	1	13	14	0	14	1	5	200
Virginia:											
Lynchburg	1		1	0	2	3	0	1	0	0	15
Norfolk	0		0	2	4	1	0	0	0	0	35
Richmond	1		1	0	5	5	0	1	1	0	68
Roanoke	2		0	0	2	2	0	0	0	10	22
West Virginia:											
Charleston	1	1	0	0	0	2	0	2	0	0	18
Huntington	0			2		6	0		0	0	
Wheeling	0		0	1	2	3	0	0	1	13	23
North Carolina:											
Gastonia	2			0		0	0		0	0	
Raleigh	0		0	1	1	0	0	2	0	8	18
Wilmington	3		0	0	0	0	0	0	0	2	14
Winston-Salem	2		0	0	1	4	0	0	0	0	9
South Carolina:											
Charleston	2	20	0	0	0	0	0	1	1	0	22
Florence	1		0	0	0	0	0	0	0	0	16
Greenville	0		0	1	0	1	0	3	0	2	25
Georgia:											
Atlanta	6	12	1	11	11	12	0	0	3	0	87
Brunswick	0		0	0	1	0	0	0	0	0	5
Savannah	2	6	0	0	2	0	0	1	0	0	31
Florida:											
Miami	0	5		2	3	2	0	2	1	1	30
Tampa	0	1	1	0	1	1	0	0	0	0	20
Kentucky:											
Ashland	0			0		3	0		0	0	
Covington	0			0	1	0	0		0	0	7
Lexington	0			0	2	2	0	2	0	5	21
Louisville	7		1	0	5	15	0	7	0	15	84
Tennessee:											
Knoxville	4	1	0	0	7	0	0	1	6	0	35
Memphis	2		0	4	3	5	0	1	1	0	72
Nashville	2		1	0	5	2	0	1	0	4	30
Alabama:											
Birmingham	3	2	1	0	3	2	0	3	0	0	75
Mobile	1	1	1	0	4	0	0	1	0	0	23
Montgomery	3			0		0	0		0	0	
Arkansas:											
Fort Smith	0			0		2	0		0	1	
Little Rock	0		0	0	0	0	0	0	0	0	
Louisiana:											
Lake Charles	0		0	0	0	0	0	0	0	0	4
New Orleans	4	2	1	0	8	10	0	10	3	1	140
Shreveport	1		0	0	7	2	0	2	0	0	49
Oklahoma:											
Muskogee	0			0		1	0		0	0	
Oklahoma City	0		1	0	2	3	0	1	0	0	38
Tulsa	1			0		13	0		0	5	
Texas:											
Dallas	2		0	1	7	21	0	2	0	2	68
Fort Worth	0		0	0	4	9	0	1	0	2	26
Galveston	0		0	0	0	0	0	0	0	0	18
Houston	9		0	0	4	11	0	2	1	1	60
San Antonio	0		1	0	2	0	0	9	0	0	52
Montana:											
Billings	0		0	0	1	0	0	0	0	0	6
Great Falls	0		0	0	0	0	0	0	0	3	6
Helena	0		0	0	0	0	0	0	0	7	1
Missoula	0		0	0	1	0	0	0	1	0	7
Idaho:											
Boise	0		0	0	0	1	0	1	0	0	10
Colorado:											
Colorado Springs	0		0	0	0	1	0	0	0	0	7
Denver	5		0	13	7	8	0	6	1	3	91
Pueblo	0		0	0	0	0	0	1	0	0	8

City reports for week ended Oct. 30, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
New Mexico:											
Albuquerque	0	------	0	1	1	4	0	1	2	0	15
Utah:											
Salt Lake City	1	------	0	0	2	13	0	0	0	2	35
Washington:											
Seattle	0	------	1	2	2	1	0	1	0	5	96
Spokane	0	------	0	5	1	4	0	0	0	8	30
Tacoma	0	------	0	0	0	3	2	1	0	7	27
Oregon:											
Portland	0	1	0	3	5	2	2	2	0	0	69
Salem	0	1	0	2	------	0	0	------	0	0	------
California:											
Los Angeles	5	5	0	3	12	27	0	17	1	37	297
Sacramento	3	1	0	0	0	2	0	0	0	5	24
San Francisco	0	------	1	1	5	7	0	15	0	59	169

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	0	2	1
Rhode Island:			
Providence	2	0	0
Connecticut:			
Bridgeport	0	0	1
New York:			
New York	7	3	8
Rochester	0	0	1
New Jersey:			
Camden	0	0	1
Newark	1	0	0
Pennsylvania:			
Philadelphia	1	0	3
Ohio:			
Cincinnati	1	0	0
Cleveland	0	1	3
Columbus	0	0	2
Indiana:			
Indianapolis	0	0	1
Illinois:			
Chicago	1	0	2
Elgin	0	0	1
Michigan:			
Detroit	0	0	2
Wisconsin:			
Madison	0	0	1
Milwaukee	0	0	2
Racine	0	0	1
Minnesota:			
St. Paul	0	0	1
Iowa:			
Davenport	0	0	1
Waterloo	0	0	2
Missouri:			
Kansas City	0	0	3
St. Joseph	0	0	1
Nebraska:			
Omaha	0	0	3
Maryland:			
Baltimore	1	1	1
District of Columbia:			
Washington	1	1	1
Virginia:			
Norfolk	1	0	0
Roanoke	0	1	0
Kentucky:			
Ashland	1	0	0
Tennessee:			
Knoxville	1	0	0
Memphis	0	0	2
Alabama:			
Birmingham	1	0	0
Arkansas:			
Little Rock	0	0	1
Louisiana:			
Shreveport	0	2	0
Colorado:			
Denver	1	0	0
Pueblo	0	0	1
New Mexico:			
Albuquerque	0	1	0
Oregon:			
Portland	1	0	1
California:			
Los Angeles	0		4
Sacramento	0	0	1
San Francisco	0	0	2

Encephalitis, epidemic or lethargic.—Cases: Elgin, 1; St. Louis, 10; Sacramento, 1.

Pellagra.—Cases: Washington, 1; Charleston, S. C., 1; Atlanta, 1; Savannah, 4; Memphis, 1; Dallas, 1; Los Angeles, 1.

Typhus fever.—Cases: New York, 1; Atlanta, 1; Montgomery, 1; Galveston, 1; Houston, 2.

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended October 23, 1937.—During the 2 weeks ended October 23, 1937, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis			3	1	1			1		6
Chicken pox		10		123	177	107	75	28	139	659
Diphtheria		3	5	156	15	1	5	3		188
Dysentery				2	8		6			16
Erysipelas				3	3	1	1	3	1	12
Influenza		10			7	2			14	33
Lethargic encephalitis						1				1
Measles		8	1	325	156	14	134	16	300	954
Mumps		8			63	5	1	9	15	101
Paratyphoid fever	2	1			4					7
Pneumonia		1			14		4		17	36
Poliomyelitis		2	12	5	108	13	56	14	2	212
Scarlet fever		34	4	174	156	58	98	41	34	599
Tuberculosis	3	41	21	94	79	23	5		29	295
Typhoid fever		1	13	101	12	4	8	1	5	145
Undulant fever				1	2					3
Whooping cough		12		344	191	103	22		66	738

CUBA

Habana—Communicable diseases—4 weeks ended October 23, 1937.—During the 4 weeks ended October 23, 1937, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Diphtheria	18	2	Tuberculosis	6	1
Dysentery (bacillary)	1		Typhoid fever	[1] 48	1
Leprosy		1	Undulant fever	1	
Malaria	[1] 64	1			

[1] Includes imported cases.

JAMAICA

Communicable diseases—4 weeks ended October 30, 1937.—During the 4 weeks ended October 30, 1937, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Chicken pox		20	Puerperal fever		3
Dysentery	8	6	Scarlet fever		1
Erysipelas		1	Tuberculosis	34	71
Leprosy		5	Typhoid fever	12	57
Lethargic encephalitis		1			

SWEDEN

Notifiable diseases—September 1937.—During the month of September 1937, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Diphtheria	22	Poliomyelitis	[1] 506
Dysentery	84	Scarlet fever	1,012
Epidemic encephalitis	5	Syphilis	28
Gonorrhea	1,274	Typhoid fever	10
Meningococcus meningitis	1	Undulant fever	19
Paratyphoid fever	208	Weil's disease	6

[1] Includes 104 cases nonparalytic at time of notification.

YUGOSLAVIA

Notifiable diseases—4 weeks ended October 10, 1937.—During the 4 weeks ended October 10, 1937, certain notifiable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	76	12	Poliomyelitis	7	
Diphtheria and croup	999	42	Scarlet fever	408	4
Dysentery	691	59	Sepsis	12	6
Erysipelas	204	5	Tetanus	36	17
Lethargic encephalitis	2		Typhoid fever	896	48
Measles	16		Typhus fever	13	
Meningococcus meningitis	10	2	Weil's disease	2	
Paratyphoid fever	38	3			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for October 29, 1937, pages 1547-1562. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued November 26, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

China.—During the week ended October 30, 1937, cholera was reported in China as follows: Hong Kong, 4 cases; Shanghai, 99 cases.

French Indochina.—During the week ended October 30, 1937, cholera was reported in French Indochina as follows: Annam, 32 cases; Haiphong, 16 cases; Hanoi, 87 cases; Tonkin Province, 735 cases.

India (French).—On October 30, 1937, 2 cases of cholera were reported in Chandernagor, and on September 11, 1937, 1 case of cholera with 1 death was reported in Karikal, French India.

Plague

Belgian Congo—Kwadruma.—On October 29, 1937, 2 cases of plague, one case of which was pneumonic, were reported in Kwadruma, Belgian Congo.

Egypt.—Plague has been reported in Egypt as follows: November 2, 1937, 1 fatal case in Banimur, Asyut Province; October 28, 1937, 1 fatal case in Bate-El-Kurabi, Girga Province.

Hawaii Territory—Island of Hawaii—Hamakua District.—A rat found on October 26, and another rat found on October 27, both in Hamakua Mill Sector, and one rat, found on October 30, in Paauhau Sector, all in Hamakua District, Island of Hawaii, Hawaii Territory, have been proved plague infected.

United States—California.—A report of plague infection in California appears on page 1685 of this issue of PUBLIC HEALTH REPORTS.

Yellow Fever

Brazil—Amazonas State—Ambrosio Ayres.—On August 17, 1937, 1 death from yellow fever was reported in Ambrosio Ayres, Amazonas State, Brazil.

Gold Coast—Lawra.—On October 28, 1937, 1 case of yellow fever was reported in Lawra, Gold Coast.

Nigeria—Maiduguri.—On October 29, 1937, 1 fatal case of suspected yellow fever was reported in Maiduguri, Nigeria.

Senegal.—Yellow fever has been reported in Senegal as follows: November 4, 2 cases imported from Rufisque and Sebikotane, including 1 suspected case, were reported in Dakar; November 1, 1 suspected case was reported in Kaolakh; October 31, 1 case was reported in Khombole, Thies Circle.

UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS is published primarily for distribution, in accordance with the law, to health officers, members of boards or departments of health, and other persons directly or indirectly engaged in public health work. Articles of special interest are issued as reprints or as supplements, in which forms they are made available for more economical and general distribution.

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Librarians and others should preserve their copies for binding, as the Public Health Service is unable to supply the general demand for bound copies. Indexes will be supplied upon request.

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PUBLIC HEALTH REPORTS

VOL. 52 NOVEMBER 26, 1937 NO. 48

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

October 10–November 6, 1937

The accompanying table summarizes the prevalence of eight important communicable diseases based on weekly telegraphic reports from State health departments. The reports from each State are published in the PUBLIC HEALTH REPORTS under the section "Prevalence of Disease." The table gives the number of cases of these diseases for the 4-week period ending November 6, the number reported for the corresponding period in 1936, and the median number for the years 1932–36.

DISEASES ABOVE MEDIAN PREVALENCE

Poliomyelitis.—The number of cases of poliomyelitis dropped from 2,615 during the 4 weeks ended October 9 to 879 for the 4 weeks ended November 6. The current incidence was lower than that for the corresponding period in both 1936 and 1935, but was considerably above that for the years 1932 to 1934. It was only about 40 percent of the incidence in the epidemic years of 1930 and 1931.

From a comparison of reports of poliomyelitis cases with the incidence in recent years it is evident that the recent outbreak affected practically every section of the country; and while the incidence has been on a decline for several weeks, the disease is still unusually prevalent in certain regions. In the West North Central region, five of the seven States in that group continued to report a rather high incidence, while in other regions the excesses seemed largely attributable to a smaller proportion of States. Some of those still reporting a relatively high incidence were California (80), New York (73), Illinois (60), Texas (40), and Michigan (35).

The South Atlantic region appears to have been the least affected by the epidemic and the incidence in that region during the current period was near the seasonal expectancy. The incidence in the Middle Atlantic region was higher than in 1936 but low in relation to the 1932–36 median. The severe epidemic of 1931 started in the Middle Atlantic region, as did also the minor epidemic of 1933, and in 1935 an outbreak that occurred in South Carolina spread also into the North Atlantic coast regions. In the South Atlantic, East South Central, and East North Central regions the numbers of cases

for the current period were considerably below the numbers reported last year, when a minor epidemic occurred in those regions; but, unlike the South Atlantic region, the current incidence in each of the East Central groups was still relatively high. The recent outbreak spread from the West South Central region into the North and East Central groups.

Number of reported cases of 8 communicable diseases in the United States during the 4-week period Oct. 10–Nov. 6, 1937, the number for the corresponding period in 1936, and the median number of cases reported for the corresponding period,

Division	Current period	1936	5-year median	Current period	1936	5-year median	Current period	1936	5-year median	Current period	1936	5-year median
	Diphtheria			Influenza [2]			Measles [3]			Meningococcus meningitis		
United States [1]	3,943	3,507	5,699	2,832	2,659	2,599	7,216	2,022	4,513	246	243	146
New England	48	42	90	13	7	19	396	440	397	10	11	8
Middle Atlantic	262	256	423	80	73	60	2,529	451	1,076	46	43	37
East North Central	620	483	1,112	309	261	329	1,740	240	570	44	54	37
West North Central	349	182	554	157	395	174	694	87	224	16	16	16
South Atlantic	1,305	1,299	1,520	750	624	749	766	155	467	57	52	22
East South Central	507	656	1,072	333	268	251	311	155	209	40	28	12
West South Central	509	332	741	871	649	628	90	55	55	10	14	14
Mountain	191	83	95	161	200	92	476	279	279	14	12	9
Pacific	152	174	211	158	182	173	214	160	798	9	13	13
	Poliomyelitis			Scarlet fever			Smallpox			Typhoid fever		
United States [1]	879	902	705	12,506	9,939	15,050	487	204	211	1,388	1,768	1,959
New England	53	19	26	672	575	796	0	0	0	41	24	51
Middle Atlantic	122	70	198	1,901	1,753	2,469	0	0	0	176	273	273
East North Central	190	436	140	4,114	2,976	4,517	53	17	52	190	243	350
West North Central	191	78	51	2,058	1,312	1,416	181	89	89	107	128	128
South Atlantic	38	72	43	1,301	1,082	1,705	2	2	3	221	433	433
East South Central	56	116	33	581	571	923	67	2	9	157	202	259
West South Central	89	40	23	619	207	423	9	4	14	334	271	271
Mountain	40	18	8	523	614	614	88	81	22	115	127	149
Pacific	100	53	53	737	849	944	87	9	44	47	67	79

[1] 48 States. Nevada is excluded, and the District of Columbia is counted as a State in these reports.
[2] 44 States and New York City. The median is for the years 1933–36 only; the data for 1932 are not comparable.
[3] 46 States. Mississippi and Georgia are not included.

With the exception of the year 1935, when an epidemic occurred in regions along the Atlantic seaboard, the current incidence has been the highest since 1931. For the first 44 weeks of the current year the number of cases totaled approximately 9,000, as compared with 3,700, 10,000, and 6,700 for the corresponding weeks in 1936, 1935, and 1934, respectively. For the same period in 1931 approximately 13,800 cases were reported.

Measles.—Approximately 7,200 cases of measles were reported during the current 4-week period—an increase of about 4,000 cases over the preceding 4 weeks. The number was about 3.6 times that for the corresponding period in 1936, and was the largest number recorded for this period in the 9 years for which these data are available. In the New England region the incidence was about on a level with the average incidence for recent years; in the Pacific region, although the number of cases was slightly above that for last year, it was less than 30 percent of the 1932–36 median. Except for these two regions, the number of reported cases of measles is unusually large in all parts of the country.

Meningococcus meningitis.—The number of reported cases of meningitis for the current 4-week period was 246, as compared with 243 and 273 for the corresponding period in 1936 and 1935, respectively; the average for this period in the years 1932–34 was 135 cases. In the South Atlantic and East South Central regions the incidence was considerably above the average level of the 5 preceding years, but other regions reported about the normal seasonal incidence.

Smallpox.—This disease still continues to be unusually prevalent. For the current period 487 cases were reported, as compared with 204, 244, and 350 for the corresponding period in the years 1936, 1935, and 1934, respectively. Of the total number of cases, North Dakota reported 88, Washington 50, Iowa 49, Montana 46, and Kentucky 29—almost one-half of the total cases occurred in those 5 States. No cases were reported from the North Atlantic regions and only two from the South Atlantic region.

Influenza.—The increase of influenza that occurred during the 4 weeks ended November 6 was slightly above normal. The number of cases, 2,832, was about 10 percent above the average incidence for the 4 preceding years. The highest incidence was reported from the West South Central region, where the number of cases (871) was the highest reported for this period in 4 years. The incidence in the East South Central and Mountain regions was also somewhat above the normal seasonal level, while other regions compared very favorably with the experience of recent years.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The 3,943 cases of diphtheria reported for the current 4-week period represented an increase of about 12 percent over the figure for the corresponding period in 1936, but it was considerably below the incidence in preceding years. The disease was more prevalent than at this time last year in all regions except the East South Central and Pacific. An unusually high incidence in Utah (129 cases) raised the incidence in the Mountain region to the highest level in recent years.

Scarlet fever.—The number of cases of scarlet fever rose from 7,431 for the preceding 4-week period to approximately 12,500 for the 4 weeks ended November 6. This figure was about 25 percent in excess of that for the corresponding period in 1936, but approximately 20 percent below the average incidence for the 5 preceding years. The disease was unusually prevalent in the West North Central region and was somewhat above the seasonal expectancy in the West South Central region. A sharp increase in scarlet fever is normally expected at this season of the year.

Typhoid fever.—The number of cases of typhoid fever, 1,388, reported for the 4 weeks ended November 6 was the smallest for this period during the 9 years for which these data are available. Texas, reporting 167 of the 334 cases occurring in the West South Central region, seemed mostly responsible for a considerable increase over recent years in that region; in the New England region the current incidence was slightly above that of 1936 and 1935; in all other regions the incidence was low in relation to preceding years.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the 4 weeks ended November 6, based on data received from the Bureau of the Census, was 10.9 per 1,000 inhabitants (annual basis). The rate was slightly lower than the rate (11.1) for the corresponding period in 1936. The average rate for this period in the years 1931–35 was 10.6, while for the preceding 5 years (1926–30) the rate was 11.6.

IMMUNIZING PROPERTIES OF FORMOLIZED ROCKY MOUNTAIN SPOTTED FEVER RICKETTSIAE CULTIVATED IN MODIFIED MAITLAND MEDIA

By IDA A. BENGTSON, *Senior Bacteriologist, National Institute of Health, United States Public Health Service*

The vaccine of Spencer and Parker (*1*) produced from Rocky Mountain wood ticks (*Dermacentor andersoni*) reared under laboratory conditions has been of great value in the prevention of Rocky Mountain spotted fever (*2*). As shown by those investigators, adult infected ticks after feeding 3 days on guinea pigs may contain as many as 5,000 minimal infective doses, which, in proportion to volume, may be 500 to 5,000 times as many as are to be found in the serum of infected guinea pigs. Ticks thus infected constitute highly infectious material, which, when inactivated with phenol or a phenol-formalin mixture, is protective against the disease.

The method of preparation of this vaccine is, however, laborious and there is a considerable element of danger in the work. Some

method not involving the use of infected ticks in the preparation of the vaccine has, therefore, seemed highly desirable. The rather favorable results recently reported by the writer (*3*) in the cultivation of the rickettsiae of Rocky Mountain spotted fever in modified Maitland media suggested the use of this material in the preparation of vaccines.

The medium used consists of one part of fresh guinea pig serum and four parts of Baker's solution with the tunica vaginalis of a guinea pig infected with the Bitterroot strain of Rocky Mountain spotted fever as the tissue component of the medium. Visceral as well as parietal tunica has been found suitable. Incubation is usually continued for 8 to 12 days at 37° C., and transfers are made to media containing fresh tissue after about the same interval of time. All flasks of cultures are stored in the warm room at 37° C.

Vaccines have been prepared from cultures carried through a number of passages and also from growth in the first generation. The cultures apparently do not lose virulence, but the organisms do not seem to become any better adapted to the medium in the later generations than in the early ones, and therefore there appears to be no advantage in making transfers for the vaccines.

I

The first vaccine was prepared in a manner similar to that used by Kligler and Aschner (*4*) for European and Mediterranean typhus vaccine except that the tissue was from flasks which had been incubated for a longer period of time. Tissue from cultures in the eleventh to the fourteenth generations which had been incubated for 2 to 3 months was separated from the fluid portion of the medium by centrifugation in pointed centrifuge tubes containing a small amount of sterile ground glass. After removal of the supernatant fluid, the precipitated tissue was triturated with a glass rod and frozen and thawed twice and again triturated. A sufficient amount of sterile saline was added so that the volume of fluid was one-half the original volume of fluid in the flasks. Formalin was added to the vaccine in the proportion of 0.1 percent, and it was allowed to stand at ice-box temperature for 10 days.

Six guinea pigs were given three subcutaneous inoculations of 1 cc each of the vaccine at intervals of 1 week. Three weeks later five of the animals, together with four controls, were inoculated with blood from an infected guinea pig. The vaccinated animals received 1 cc, the controls, through oversight, 2 cc, which is the amount routinely used for transferring the strain.

The controls all developed typical symptoms of Rocky Mountain spotted fever and died. Three of the vaccinated animals did not show temperatures above 39.6° C., while two had temperatures ranging

from 39.7° to 40.3° C. for periods of 3 to 4 days. All of these animals survived.

LL

The results obtained in the first test were sufficiently encouraging to justify further tests. A second vaccine was prepared from material in the first generation of growth after removal of tissue from the guinea pig. This material was obtained from the animal on the sixth day of fever and consisted of visceral tunica. Incubation of the cultures was continued for 12 days at 37° C.

In the preparation of this vaccine the method used was partially suggested by the method used by Laidlaw and Dunkin (*5*) in the preparation of a vaccine against dog distemper, though in their vaccine tissue taken directly from ferrets was used as the vaccine material.

The tunica tissue after separation from the fluid portion of the medium by centrifuging was not subjected to freezing and thawing as before but was simply macerated with a glass rod in the presence of powdered glass. It was then made up to one-half of the original volume of the fluid portion of the Maitland media with sterile 0.85 percent salt solution and transferred to a flask containing sterile glass beads. After vigorous shaking for 15 minutes, the suspension was drawn through a small piece of sterile cotton held against the bottom of the flask with a 10-cc pipette. Dilutions of 1/10, 1/50, and 1/250 were tested on guinea pigs, with the following results:

Dilution 1/10 Guinea pig 1: No temperature.

Dilution 1/10 Guinea pig 2: Fever sixth day followed by death on seventh day.

Dilution 1/50 Guinea pig 3: Fever fifth to twelfth days. Survived.

Dilution 1/50 Guinea pig 4: Fever fifth to twelfth days. Survived.

Dilution 1/250 Guinea pig 5: Fever seventh to fourteenth days followed by death on fourteenth day.

Dilution 1/250 Guinea pig 6: No fever. Died on sixth day.

Formalin was added to the vaccine in the proportion of 0.1 percent and it was allowed to stand at ice-box temperature for 10 days. It then contained a certain amount of precipitate. It was divided into two equal parts and one part (R2a) was left in the same state and the precipitate was removed from the other part (R2) by slow centrifuging and the supernatant fluid was used as the vaccine.

Five guinea pigs were given two subcutaneous inoculations of 1 cc each of vaccine (R2) and 5 were similarly inoculated with vaccine (R2a). The inoculations were 1 week apart. Two weeks later, the 10 vaccinated animals, together with 4 controls, were inoculated intraperitoneally with 1 cc of blood from infected guinea pig.

All the control animals developed typical symptoms of Rocky Mountain spotted fever in 4 days and all died in from 4 to 15 days. All the vaccinated animals survived without showing a temperature rise or other symptoms of the disease (table 1).

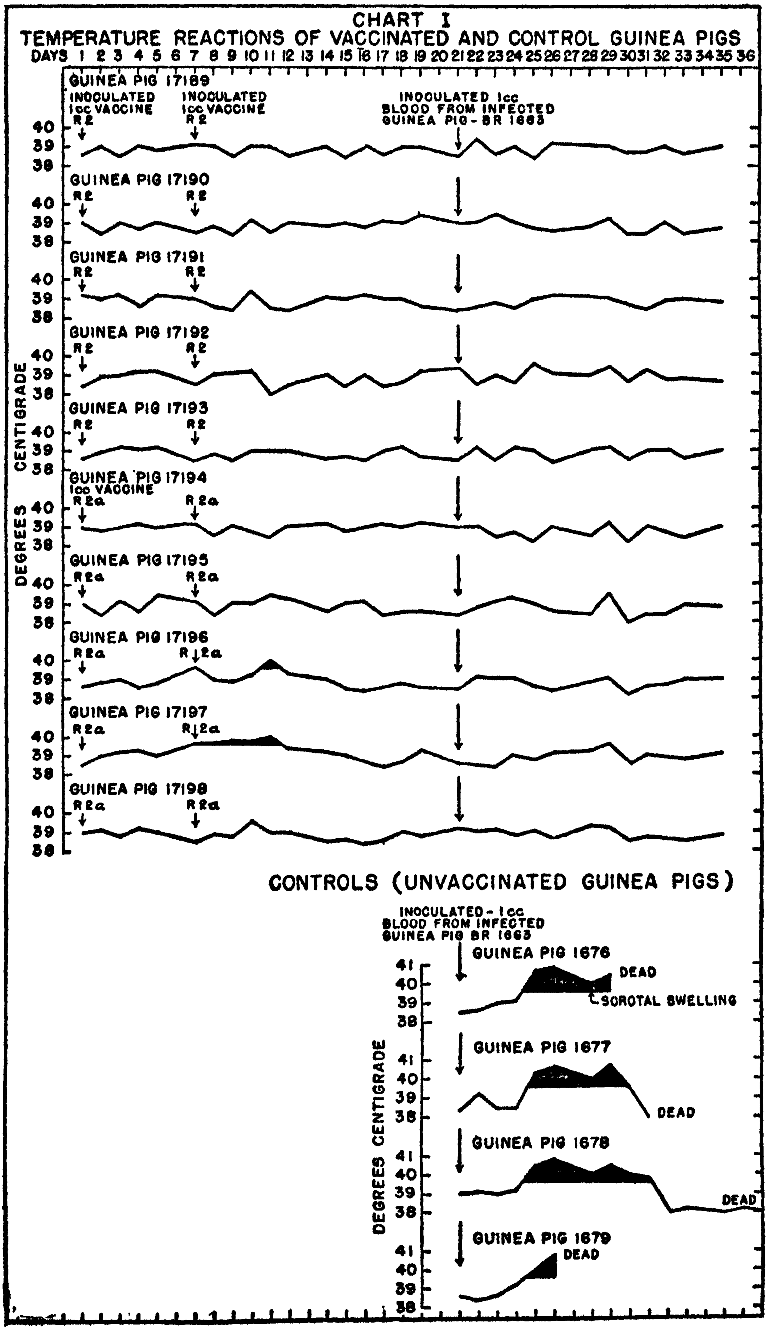
CHART I
TEMPERATURE REACTIONS OF VACCINATED AND CONTROL GUINEA PIGS
DAYS 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
GUINEA PIG 17189
INOCULATED 1cc VACCINE R2
INOCULATED 1cc VACCINE R2
INOCULATED 1cc BLOOD FROM INFECTED GUINEA PIG - BR 1663
GUINEA PIG 17190
GUINEA PIG 17191
GUINEA PIG 17192
GUINEA PIG 17193
GUINEA PIG 17194
1cc VACCINE R2a
GUINEA PIG 17195
GUINEA PIG 17196
GUINEA PIG 17197
GUINEA PIG 17198
DEGREES CENTIGRADE
CONTROLS (UNVACCINATED GUINEA PIGS)
INOCULATED - 1cc BLOOD FROM INFECTED GUINEA PIG BR 1663
GUINEA PIG 1676
DEAD
SCROTAL SWELLING
GUINEA PIG 1677
DEAD
GUINEA PIG 1678
DEAD
GUINEA PIG 1679
DEAD

TABLE 1.—*Temperature records of vaccinated and control guinea pigs*

Day	R2-vaccinated guinea pigs					R2a-vaccinated guinea pigs					Control guinea pigs			
	17189	17190	17191	17192	17193	17194	17195	17196	17197	17198	BR1676	BR1677	BR1678	BR1679
1 (day of first inoculation with vaccine)	38.6	39.0	39.2	38.4	38.6	39.0	39 0	38.6	38.5	39 0				
2	39.0	38 4	39.0	38.9	39.0	38.8	38.4	38 9	39 0	39.1				
3	38.5	39.0	39.2	39 0	39 2	39.0	39.2	39.0	39.2	38.8				
4	39.0	38 7	38.6	39.2	39 1	39.2	38.6	38 6	39.3	39.2				
5	38.8	39.0	39.2	39.2	39.2	39.0	39 5	38.8	39 0	39.0				
6														
7 (day of second inoculation with vaccine)	39 1	38 5	39.0	38.5	38.5	39 2	39.1	39 7	39.7	38.5				
8	39.0	38.8	38.6	39.0	38.8	38.6	38.4	39 0	39 7	38.9				
9	38 5	38 4	38.4	39.1	38 5	39 1	39 0	38 9	39 8	38.8				
10	39.0	39.1	39.4	39 2	39.0	38.8	39.0	39 2	39 8	39.6				
11	39.0	38 5	38.5	38.0	39.0	38.5	39 5	40 0	40 0	39 0				
12	38.5	39.0	38.4	38.5	39.0	39.0	39 2	39 3	39.4	39.0				
13														
14	39.0	38.8	39.1	39 0	38.6	39 2	38 6	39 0	39 2	38 5				
15	38.4	39.0	39.0	38.4	38.7	38 8	39 0	38.5	39 0	38 6				
16	39.0	38.8	39 2	39.0	38.5	39.0	39.1	38.4	38.7	38 4				
17	38.6	39.1	39 0	38.4	39.0	39 2	38.4	38.6	38 4	38.6				
18	39.0	39.0	39.0	38.6	39 2	39.0	38 6	38 8	38 7	39.0				
19	39 0	39.4	38.6	39 2	38.7	39.2	38.6	38 6	39.3	38.8				
20														
21 (day of inoculation with infected blood)	38.5	39.0	38 4	39.4	38.5	39.0	38 4	38.5	38.6	39.2	38.5	38.4	39.0	38.6
22	39 4	39 0	38.5	38 5	39.2	39 0	38.8	39.1	38 5	39 0	38.6	39.2	39.1	38.4
23	38.6	39 4	38.8	39 0	38.5	38.5	39 1	39.0	38 4	39 1	39.0	38.5	39.0	38.6
24	39.0	39 0	38.5	38.6	39.2	38.7	39.3	39 0	39 0	38.8	39 1	38.5	39.2	39 2
25	38.4	38.7	39.0	39 6	39.0	38.2	39.0	38 6	38.8	39 0	40.7	40.3	40.5	40.0
26	39.2	38.6	39.2	39.1	38.4	39.0	38.6	38 4	39 1	38.6	40.9	40.6	40.8	40.8
27														Dead.
28	39.1	38.8	39 1	39.0	39.1	38 5	38.4	38.8	39.2	39 3	40 RS*	40.0	40.0	
29	39.0	39 2	39.0	39 4	39.2	39.2	39 5	39.0	39.6	39.2	40.4	40.7	40.5	
30	38.7	38.4	38.7	38 6	38.5	38.2	38.0	38.2	38 5	38 5	Dead.	39.6	40.0	
31	38.7	38 4	38.4	39.2	39 0	39 0	38.4	38.6	39 0	38 7		38.0	39.8	
32	39.0	39 0	38 9	38.7	39 0	38.7	38.4	38 7	38.9	38.6		Dead.	38.0	
33	38.6	38.4	39.0	38.8	38.6	38 4	38.9	39.0	38.8	38.5			38.2	
34														
35	39.0	38.7	38.8	38.6	39.0	39.0	38.8	39.0	39 0	38.8			38.0 38.2 Dead.	

*Scrotal lesions.

During the process of vaccination 2 of the animals developed slight temperatures, 1 having a temperature of 40° C. for 1 day and the other having temperatures ranging from 39.7° to 40° C. for 5 days. These two animals were in the group which had been inoculated with the vaccine (R2a) from which the precipitate had not been removed. It is possible that there were small pieces of tissue containing rickettsiae which had not been killed by the formalin.

DISCUSSION

As described in the publication referred to by the writer (*3*), the rickettsiae of Rocky Mountain spotted fever are present in fair numbers in the modified Maitland media. While the rickettsiae of endemic and European typhus were much more numerous in the same medium, the results with vaccines prepared from the cultures of endemic typhus rickettsiae have been less encouraging than those here reported. Apparently the rickettsiae of Rocky Mountain spotted fever are more highly antigenic than those of endemic typhus.

Spencer and Parker call attention to the contrast in immunizing properties of tissue and tick virus, the killed tick virus possessing strong immunizing properties such as were "rarely exhibited by killed tissue virus." It seems probable that the number of rickettsiae present in the tissue influence to some extent the results obtained. There are many more rickettsiae associated with the tissue in Maitland media cultures than are visible in the tissue as removed from the guinea pig. After removal of the tissue from the body and transfer to the Maitland media, it remains viable for 4 or 5 days. At the same time the inhibiting factors which tend to limit the multiplication of the organisms in the body are absent and the rickettsiae are more free to multiply.

The amount of vaccine which may be prepared from the tunica of one guinea pig is sufficient to suggest this method of preparation as practicable. The visceral tunica is as suitable as the parietal tunica and much more of it is available. In our work the parietal tunica is usually distributed among three or four flasks containing 5 cc of the fluid portion of the medium. The amount of visceral tunica from one testicle is sufficient for 15 or 16 flasks and, therefore, the number of flasks from one guinea pig would total 35 or 40. Diluting the tissue suspension to about one-half of the original volume, the amount obtained would be 90 to 100 cc, which would be sufficient to immunize 40 to 50 guinea pigs. If transplants are made to flasks containing fresh media for second passage growth, the number of flasks may be multiplied by four, as the material in one flask is usually sufficient to inoculate four fresh flasks. The results obtained, therefore, appear to justify further experimentation with vaccines prepared from the growth in the media described.

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METHODS FOR THE DETERMINATION OF QUARTZ IN INDUSTRIAL DUSTS

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Increasing understanding of the role of quartz as the causative agent in silicosis has given rise to an insistent demand for better methods of determining the quartz content of dusts, especially in the presence of silicates.

At present the available methods are more or less unsatisfactory from the point of view of their general applicability to routine analysis. In 1933, Knopf (*1*), in his paper on the quantitative determination of quartz in dusts, brought the subject up to date. Since that time other procedures have been developed or suggested. It is the purpose of this paper to assemble this material, and in presenting it together with Knopf's method, to determine the present status of the question.

Chemical analyses of rock samples are reported more or less arbitrarily in terms of the oxides of the elements present. Silicon is reported as silica (SiO_2), silicon dioxide. Thus, if it is stated that a rock or dust sample contains a certain percentage of silica, there is no implication that the silicon is present as quartz, as silicate, or any other compound of silicon. To make a distinction, the term "free silica" is usually used to mean quartz but may denote any form of silicon dioxide, and the term "combined silica" is used to denote silica that is combined with other elements in the various siliceous materials. In other words, the percentage of silica or total silica is the sum of the "free silica" plus the "combined silica".

Methods for the determination of quartz fall into two classes, chemical and petrographic. Chemical methods usually depend on dissolving or decomposing all of the material present with the exception of the quartz, which can then be isolated and determined by either weighing it or volatilizing it with hydrofluoric acid and determining it by difference.

The procedure and principles involved in petrographic analysis are covered in most of the standard works on mineralogy (*2*) (*3*) (*4*). Flotation methods fall under general mineralogy.

CHEMICAL METHODS

Ultimate analysis.—A complete chemical analysis is made following the methods of rock analysis (*5*).

Knopf's procedure using hydrofluosilicic acid.—After a preliminary petrographic examination, the material is treated as follows:

It is first ground to pass a 150-mesh sieve. It is then weighed in a platinum crucible. About half a gram sample is taken.

If the preliminary microscopic examination indicates the presence of any organic material, the platinum crucible and its contents are carefully heated to white heat for 30 minutes to burn off the organic matter.[1]

Hydrochloric acid treatment.—If the preliminary examination shows the presence of carbonate minerals, hydrochloric acid is added to the contents of the platinum crucible and the crucible is gently heated. The contents of the crucible are filtered and washed, and the filter paper and precipitate are ignited in the same platinum crucible, which is then allowed to cool.

Hydrofluosilicic acid treatment.—After these operations, hydrofluosilicic acid in moderate excess is added to the material in the platinum crucible. If the composition of the dust is such that the ignition and hydrochloric acid treatment are unnecessary, the hydrofluosilicic acid is added to the substance to be analyzed immediately after the first weighing. The crucible is carefully covered and set away in a place where the temperature is reasonably constant and *not above room temperature.* Care must be exercised not to raise the temperature during the hydrofluosilicic acid treatment, because hydrofluosilicic acid (H_2SiF_6) decomposes, on heating, into silicon tetrafluoride (SiF_4) and hydrofluoric acid (HF), which will readily attack the free silica. It is left for a time, ranging in different specimens from 24 to 48 or even 72 hours. Some samples may require a week or more to decompose.

It is then carefully decanted into an ashless filter paper, and the crucible contents are thoroughly washed onto the filter paper. The precipitate is washed until the wash water gives no precipitate in a clear mixture of dilute KCl with 95 percent alcohol. The precipitate is dried, ignited in the platinum crucible, and weighed, and the percentage loss in weight is noted.

The hydrofluosilicic acid treatment is repeated until the weight of the residue remains unchanged.

Microscopic examination of residue.—A small portion of the residue is then examined under the petrographic microscope. If minerals other than quartz are present, the amount of quartz in the residue

[1] It is safer to omit this ignition. The presence of alkali carbonates may cause fusion of the sample and in this way convert quartz to silicate.

can be estimated with a reasonable degree of accuracy. If quartz is the only mineral indicated by the microscopic examination, the percentage of quartz in the sample can be calculated directly from the weight of the residue.

Volatilization of residue with hydrofluoric acid.—A check on the microscopic determination of quartz is given by volatilizing the residue with hydrofluoric acid in the platinum crucible. Free silica volatilizes completely with hydrofluoric acid. Combined silica in silicate minerals volatilizes with hydrofluoric acid; but after the treatment, there remains a residue made up of the bases that were in combination in the silicates. If no residue is left, the material was all quartz.

It is necessary to apply a correction factor for the loss of quartz due to its solubility in hydrofluosilicic acid. Knopf determined this factor and found it to be 0.7 percent per day for pure ground quartz passing a 150-mesh sieve.

The sieving of samples, while placing limits upon the size of the grains, does not give an accurate picture of the physical characteristics of the sample. It is necessary to know the particle size distribution of the ground material. The median particle size and the standard deviation should be determined. For example, two samples having the same particle size as determined by sieving may have a greatly differing percentage of particles of a certain particular size (*6*). The solubility of the quartz in a given reagent will depend on the percentage of very finely divided material in a given sample. Controls must, therefore, be run, using quartz having the same particle size distribution as in the sample.

The fluoboric acid method.—Line and Aradine (*7*) have developed a method for the determination of quartz following the lines of Knopf's method but substituting fluoboric acid for hydrofluosilicic acid. The procedure is as follows:

Preparation of fluoboric acid.—Dissolve 32 grams of purified boric acid in 75 cubic centimeters of pure 48 percent hydrofluoric acid. Pour the hydrofluoric acid into a 125-cubic centimeter platinum dish and cool this in an ice bath. Keeping the dish in the ice bath, add the boric acid in small amounts, allowing each portion to dissolve before more is added. In this way the solution does not become overheated. When all the boric acid has been added (the last portion will not dissolve while the solution is cold), concentrate the solution to about 50 cubic centimeters on a steam bath. Cool to 0°–5° and filter. The resulting acid is a slightly yellow, fuming, sirupy liquid that should have a specific gravity of about 1.45 and should analyze about 40 to 45 percent HBF_4 by the Lange method. It should give no test for fluoride with calcium chloride or lead nitrate solutions. It must be

stored in wax or rubber bottles, but the filtration may be done with glass apparatus.

Decomposition of silicate.—In a platinum crucible, weigh a 0.15- to 0.2-gram sample of material that has been ground to pass a 100-mesh sieve. To this add 5 cubic centimeters of fluoboric acid, 1 cubic centimeter of phosphoric acid, specific gravity 1.39, and 2 cubic centimeters of 2 M ferric chloride. Heat the crucible at 50° C. for 48 hours, adding more ferric chloride if the yellow color of the solution fades. Transfer the residue to an ashless filter and wash four times with N hydrochloric acid and five times with hot water. Unless the residue is negligible at this point, place paper and residue in the crucible and destroy the paper by heating the crucible to dull redness. Repeat this treatment for 48 hours longer. Filter, wash, and determine the weight of the residue. Unless solution has been complete, repeat this treatment for 48-hour periods until a loss of only 1 to 2 milligrams is found. This indicates complete solution of the silicate.

Some siliceous materials may be decomposed in less than 48 hours, in which case the treatment with fluoboric acid should be stopped as soon as complete decomposition is apparent. In other cases, even 8 to 12 days may not effect complete decomposition.

Determination of free silica.—Treat the residue insoluble in fluoboric acid with 2 to 3 cubic centimeters of 48 percent hydrofluoric acid, and repeat until constant weight is obtained after ignition. The loss in weight corresponds to the free silica content of the residue. This value must be corrected for the amount of free silica dissolved during the time required to decompose the silicate. The correction factor is 0.34 percent per day.

When the residue is practically pure silica, the treatment with hydrofluoric acid will give the correct value for quartz; if undecomposed silicates remain, the loss with hydrofluoric acid will be too high, owing to attack of the silicates.

Apparatus.—For maintaining the crucibles at a constant temperature for long periods, a large vacuum desiccator is placed in an electric oven, the heating unit of which is controlled by a thermostat. An outlet tube is connected to a suction pump and a constant current of warm air to remove the fumes is drawn through the desiccator. The inlet tube is so arranged that a thermometer can be inserted into the desiccator to check the temperature without disturbing the apparatus.

This method is an improvement on Knopf's procedure inasmuch as the correction factor for the solution of the quartz is only 0.34 percent per day at 50° C. However, the decomposition even under these conditions is still large enough to make a correction factor necessary. An advantage claimed for this method is that fluoboric acid dissolves a variety of silicates more rapidly than does fluosilicic acid, and a greater

number of more insoluble silicates can also be dissolved in fluoboric acid.

Shaw's modification of Selvig's method—"Rational Analysis."—Shaw (*8*) has described this method and has made some improvements in it. It is applicable only to special kinds of silicates—the coal measure rocks and shales (*9*).

Shaw's procedure is as follows: Five grams of the sample, ground to pass 60 mesh, are mixed with 300 cubic centimeters of dilute hydrochloric acid (2.5 percent by volume), and heated to boiling in a deep porcelain dish of 1,300-cubic centimeters capacity. The dish is allowed to stand for 2 hours, or until the material has settled, and the clear liquid is siphoned off. It is advisable to have a tap or pinch-cock in the siphon tube to reduce the rate of flow toward the end of the operation; if the siphon is clamped so that the end of the short limb is adjustable in the liquid, it will be found possible to remove practically the whole of the solution without disturbing the solid material. The residue is stirred with 100 cubic centimeters of water, 100 cubic centimeters of sulphuric acid (1 : 1) are added, and the mixture is boiled, with frequent stirring, until acid fumes are freely evolved. The temperature of the solution should not rise above 200° C., and the total time of evaporation should be approximately 45 to 60 minutes.

The dish is allowed to cool for 30 minutes, and its contents are diluted with a liter of water, well stirred, and allowed to settle. The clear solution is siphoned off, and the residue is treated with 100 cubic centimeters of water and 100 cubic centimeters of the sulphuric acid and evaporated once more. After dilution, and settling and siphoning off the solution, the residue is neutralized with Lunge solution (100 gm of crystallized sodium carbonate + 10 gm sodium hydroxide in 1 liter of solution). If the amount of acid liquid remaining in the dish is large (20 cc or more), 50 percent sodium hydroxide solution should be used for neutralization, to prevent excessive dilution of the Lunge solution in the following operation. Three hundred cubic centimeters of Lunge solution are then added, and the liquid is heated to boiling, with frequent stirring. After standing for 2 hours, the solution is siphoned off, and the residue is boiled for 5 minutes with 500 cubic centimeters of concentrated hydrochloric acid, diluted to 1 liter, and allowed to settle. The acid solution is siphoned off, the residue is neutralized with Lunge solution or 50 percent sodium hydroxide solution, 150 cubic centimeters of Lunge solution are added, and the liquid is heated to boiling.

After standing for 2 hours, the Lunge solution is siphoned off, and the residue is boiled for 5 minutes with 200 cubic centimeters of concentrated hydrochloric acid. Two hundred cubic centimeters of water are then added, and the liquid is filtered through a Whatman

No. 40 filter. The residue is transferred to the filter, washed twice with hydrochloric acid (1:3 by volume) and then with water, until the washings are free from chlorides, and, finally, ignited to constant weight in a tared platinum crucible. To the ignited residue are added 5 cubic centimeters of water, 5 to 10 drops of concentrated sulphuric acid, and 15 cubic centimeters of hydrofluoric acid, and the resultant liquid is evaporated on a hot plate until sulphuric acid fumes are evolved. The evaporation is repeated with two further quantities of hydrofluoric acid, heating being continued during the final evaporation until sulphuric acid fumes are *freely* evolved, to insure complete removal of fluorine, which would interfere with the determination of alumina in the residue. The contents of the crucible are extracted with water, and the solution is filtered. The alumina in the extract is then determined in the usual way by precipitation with ammonia, methyl red being used as indicator to avoid excess. The weight of alumina, multiplied by 5.41, gives the equivalent weight of potash feldspar, and this, subtracted from the weight of the ignited residue previously determined, gives the amount of quartz or "free silica" in the sample.

PETROGRAPHIC METHODS

Determination of free silica in rocks.—In general, it is comparatively easy to identify quartz in a rock specimen by petrographic methods, using the polarizing microscope. The sample is crushed to a powder the individual grains of which are about 0.06 millimeters in thickness. Portions of the powder are then successively immersed in liquids of known refractive indices until a point is reached where in one position of the microscopic stage the boundary between the grains and the liquid disappears. This occurs when a refractive index of the mineral is the same as the index of the liquid in which it is immersed. By this method, the refractive indices of a mineral can be determined, together with other optical properties.

In the case of quartz, the mineral is identified by the following criteria: Cleavage not distinctly observed; fracture conchoidal to subconchoidal, uneven to splintery; hardness = 7; specific gravity, 2.65; luster vitreous, colorless when pure; streak, white; transparent to opaque; uniaxial, optically positive; double refraction weak; indices of refraction, $\omega = 1.544$, $\epsilon = 1.553$.

No one of such criteria is sufficient to determine a mineral, although one criterion may be enough to distinguish it from some other mineral with which it is associated. Some minerals can be identified by determining three or four optical properties; others require more for conclusive determination. According to Knopf, the smallest grain which can be positively identified by petrographic methods is about 10 microns.

The Rosiwal method.—For petrographic quantitative determination, investigators have used the Rosiwal (*10,11*) method. This method consists in measuring the linear intercepts of a given mineral along numerous parallel lines. The ratio between the sum of all the intercepts of quartz to the length of the measured traverse should give the percentage of quartz, because it can be shown mathematically that the linear intercepts are proportional to volumes.

However, two minerals may crystallize in widely different habits. It is, therefore, necessary to determine the shape factor (*6*) of a mineral and take it into account when making any calculation of volume.[3]

The method of Ross and Sehl (*12*).—This method depends entirely upon the value of the refractive indices of the constituents in the sample. It is an application of the Becke line principle. The dust is immersed in fennel-seed oil, which has a refractive index of 1.54. After focusing the microscope, the objective is raised. All particles with a refractive index greater than 1.54 will appear bright, while the remainder will appear darker. These bright particles will consist of quartz plus particles which have a higher refractive index than quartz. Another portion of the dust is immersed in nitrobenzene, which has a refractive index of 1.55. It is examined in the same way. This time the bright particles are those which have a higher refractive index than quartz. If A is the percent of bright particles in fennel-seed oil and B the percent of bright particles in nitrobenzene, then:

$$A-B=\% \text{ of quartz or ``free silica''}$$

In making the counts and measurements of particle size, a Sedgwick-Rafter cell is used and a Whipple disk. According to Line and Aradine, "the modified petrographic immersion method of Ross and Sehl is capable only of a reasonable accuracy."

This method is open to a number of objections. Error is introduced in making the conversion from particle size to percent by weight. More serious, however, is the fact that only one criterion is used for the identification of the mineral, the refractive index. Anticipating this objection, Ross and Sehl state in a footnote in their paper: "This method does not positively identify the counted particles as quartz. There are other minerals whose refractive indices would fall within the limits of 1.54 to 1.55. But in ordinary dust analyses these other minerals do not occur in amounts sufficient to cause appreciable error." Exception is taken to this last statement. To take an extreme case, but nevertheless an actual one, three samples of rock drillings were received for analysis. In these samples, which turned out to be mainly diorite, and consisted almost entirely of feldspar

[3] Report of an investigation of this matter will shortly be published by this laboratory.

and quartz, the feldspar had a refractive index identical with that of quartz. Using the above method, the sample would consist of 95 percent quartz, whereas actually there was less than 5 percent of quartz present. Other criteria, such as twinning, cleavage, and interference figures were used to differentiate the two minerals.

Flotation methods.—Quartz may be separated from other minerals which differ from it in specific gravity by the use of various liquids of definite specific gravity. Bromoform is one of such liquids commonly used. Sartorius and Jötten (*13*) have developed a method using a mixture of acetylene tetrabromide and ethylene bromide. The dust is treated with sulphuric acid, dried, and then centrifuged in this mixture, whose specific gravity approaches that of quartz, 2.65. By centrifuging at great speed (10,000 r. p. m.) it is possible to remove everything of specific gravity under 2.63. The remaining particles are examined for quartz.

LIMITATIONS OF THE FOREGOING METHODS

1. Attempts are always being made to calculate the quartz content of a material from its chemical analysis. Sometimes this method proves quite successful (*14*); but unless the various minerals in the sample have been identified petrographically, the chemist has no definite facts upon which to base his calculations. Shaw (*8*) gives the following data on four samples in order to show the error which such procedures may lead to:

Sample no.	Percent of quartz (calculated)	
	Composition assumed to be quartz, feldspar, kaolin, etc.	Composition assumed to be quartz, micas, kaolin, etc.
1	11.4	17.6
2	19	34.8
3	64.2	67
4	4	11.5

Calculations based on the formulas for certain minerals as given in texts on mineralogy should never be made. Such formulas are usually empirical and may refer to a particular sample from some definite locality, or they may refer to an ideal formula for the pure mineral. It is necessary to analyze the particular mineral which is a constituent of the sample and then apply the results of such an analysis for such calculations. This should be done with the utmost caution.

2. According to Ross and Sehl, the hydrofluosilicic acid method is inaccurate for such materials as shale, clay, pumice, etc., when compared with petrographic methods. As described, the method applies

to material ground to pass a 150-mesh sieve. When applied to finely divided material, the use of this method may lead to erroneous results. This is due to the increased solubility of quartz in hydrofluosilicic acid as the exposed surface of the quartz increases.

Hatch and Moke *(15)*, after using this method on foundry dusts, were led to doubt the accuracy of their results. Accordingly, Moke *(16)* investigated the solubility of finely divided quartz in hydrofluosilicic acid. He found that the quartz was soluble in this acid to a fairly great extent. "If sufficient time and acid were employed, all the quartz would undoubtedly go into solution."

3. Line and Aradine tested their fluoboric acid method on 17 mineral silicates. They found that six of these—garnet, sillimanite, zircon, beryl, forstirite, and dumortierite—could not be completely decomposed. They used material ground to pass through a 100-mesh sieve.

The author measured the solubility of finely divided quartz in fluoboric acid. A 325-mesh sample with a median size of 8.4 microns and a geometric standard deviation of 3 was used. For the first 48 hours the samples lost 1.4 percent per day. After 48 hours the loss dropped to 0.8 percent per day. This is twice as great as the loss reported for 100-mesh quartz, viz, 0.34 percent per day.

4. Shaw's modification of Selvig's method is applicable only to the coal measure rocks and shales.

Samples must be ground to pass a 60-mesh sieve. Experiments by Shaw on the solubility of quartz in Lunge solution showed that finely divided quartz is readily soluble. The following figures were obtained by him:

Solubility of quartz in Lunge solution

	Percent
5 grams, 200 mesh	2. 0
0.5 grams, 200 mesh	6. 2
60 mesh	1. 2

Mineralogical analysis.—A mineralogical analysis combines chemical and petrographic methods. When determining the quartz content of dusts it is absolutely essential to use such methods. From a consideration of the foregoing methods it is seen that no one of these methods is adequate for dust determinations. The median size of industrial dust samples runs below 10 microns. For rafter samples it is about 7 microns. Quartz ground to pass a 200-mesh sieve has a median size of 65 microns. It is, therefore, necessary when adopting any of the chemical methods to run careful controls on quartz having the same particle size distribution as the sample to be analyzed, in order to determine whether the correction for the solubility of the quartz will be small enough to insure reasonable accuracy.

When dealing with dusts below 10 microns, quantitative petrographic methods also break down. However, it is usually possible

when examining a dust sample to find a number of particles which are large enough to be identified. In this way one may get a rough idea of the constituents in a given dust sample.

RECOMMENDED PROCEDURE FOR DUSTS

Sampling.—By judicious sampling it is possible to overcome many of the difficulties inherent in the analysis of dusts. The more information the analyst can obtain concerning the sample, the easier it is for him to make a satisfactory analysis. The accompanying form is designed to provide such information.

DUST SAMPLE SUBMITTED FOR ANALYSIS

Sample number .... Industry .... Location ....

Where was sample collected? (Name of factory, quarry, mine, etc.) ....

What process was carried on where this sample was collected? ....

....

....

Method used for collecting sample ....

From what material did this dust presumably arise? ....

(Samples of the coarse material should be submitted, together with any available analytical data.)

IF SAMPLE IS OF MINERAL ORIGIN:

Name of principal mineral ....

Location of deposit ....

Nature of deposit (vein, dike, bed, etc.) ....

Size of deposit ....

Associated gangue materials ....

Geological description of area ....

....

ADDITIONAL INFORMATION ....

....

....

Date .... Collected by .... Submitted by ....

Supplementing the actual dust sample, samples of all the materials from which the dust may have presumably arisen should be obtained. Such materials will usually prove amenable to analysis, whereas the dust itself may not. In many cases it happens that the dust sample has practically the same chemical composition as the material from which it arises.

In such a case it is very simple to obtain an accurate analysis of the dust sample from the analysis of the parent substance. In any case an overabundance of samples is not a great evil, while the lack of a particular sample may make itself keenly felt.

Petrographic methods.—A petrographic examination should always be made. It is a basis for further work on the sample, whether along petrographic or chemical lines.

Chemical methods.—A complete chemical analysis should be made. The total silica content alone at least gives the upper limit for the amount of free silica present. With judgment, a certain minimum amount of silica necessary for combination with the other elements present may also be calculated.

With this information available, it becomes easier to make a choice of a method for further identification of the dust, the hydrofluosilicic acid method, the fluoboric acid method, etc. Sometimes it may be necessary to use more than one, or all, of these methods.

SUMMARY

Various methods for the determination of quartz or "free silica" have been given. No one of these methods has general applicability for all dusts regardless of their composition. Therefore, a petrographic examination is first made and also a chemical analysis. Then one or more of the methods herein outlined is used to determine quartz. After the minerals and other constituents of a dust sample have been identified, it is usually possible to choose a suitable procedure.

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A STUDY OF DUST CONTROL METHODS IN AN ASBESTOS FABRICATING PLANT

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An extensive medical and engineering study of the health of asbestos workers has been conducted by the United States Public Health Service (*5*). The material contained in this paper supplements the general study with a detailed study of the dust control methods used in an asbestos fabricating plant. It is a report on present conditions and how they have been obtained and is presented as an example of the results of the application of scientific methods of dust control. These data should be interesting not only to the asbestos industry but also to other industries having similar dusty processes.

The plant studied has only partly completed an extensive dust control program, and conditions are being improved continually; consequently, these results should not be interpreted as representing the maximum possible efficiency in the control of asbestos dust, but it is believed that they are representative of the best practice in this country at this time. The dust control systems in use with the various processes in each department are described. An occupational analysis of employees is presented, with a comparison of the atmospheric dust concentrations associated with controlled and similar uncontrolled processes.

FABRICATION OF ASBESTOS TEXTILES

Asbestos is the class name for several different fibrous minerals, but the asbestos of commerce (*1*) is mainly the fibrous form of serpentine known as chrysotile.[1] Due to its fibrous nature, flexibility, and heat-resistant properties, asbestos fiber finds many practical applications. One of its important industrial uses is in the manufacture of fire-resistant textiles.

In the plant studied, practically all raw material was crude Canadian or South African asbestos. Some imported short fiber was used, as well as some of the short fiber salvaged in the recovery process, but most of the short recovered fiber was shipped to other plants. Significant variations in atmospheric dust concentrations due to the grade of fiber being processed were not evident in controlled processes in this plant. Consequently, the type of fiber used has not been considered in the analysis of the data. Each dust controlled process tended to decrease the amount of dust generated in subsequent

[1] Chrysotile is a hydrous magnesium silicate ($H_4Mg_3Si_2O_9$ or $2H_2O \cdot 3MgO \cdot 2SiO_2$) containing 44.1 percent silica, 43.0 percent magnesia, and 12.9 percent water. Other types of asbestos often contain silicates of iron, calcium, and aluminum as well as magnesium (*2*).

processes. These factors must be considered when comparing dust concentrations reported in this plant with the data which have been reported for other plants.

Approximately 300 persons were employed in this plant, of whom 180 worked in departments having a potential asbestos dust hazard. This study was confined to these departments; namely, preparation; carding; spinning, twisting and winding; and weaving. The occupational distribution of exposed workers is shown in table 1.

TABLE 1.—*Occupations and dust exposures of workers in an asbestos textile plant*

Occupation	Number of workers	Average dust concentration, M. P. P. C. F.	
		Normal	Without exhaust ventilation
Preparation:			
Crushermen	2	3.5	
Cotton openers	1	----------	
Asbestos openers	2	[1] 3.5	[2] 59.6
Bed builders	2	[1] 5.4	
Pickermen	2	[1] 6.7	
Others	5	[1] 2.4	
Carding:			
Carders	6	[1] 1.7	[2] 62.4
Stock rollers	10	[1] 4.6	[2] 40.4
Card tenders	8	[1] .7	----------
Wick, rope, and cord	6	1.7	----------
Others	6	.3	----------
Spinning, twisting, and winding:			
Mule spinners and helpers	32	.9	----------
Ring spinners	6	5.0	----------
Spoolers	16	[1] 2.9	[3] 9.6
Cop winders	4	6.9	----------
Twisters	13	11.0	----------
Universal winders	7	2.8	----------
Others	16	5.0	----------
Weaving:			
Weavers:			
Dry cloth	18	[1] .7	[3] 9.6
Wet cloth		2.7	----------
Tape and listing		3.0	----------
Creelers	7	1.3	----------
Inspectors—Cloth	2	[1] .5	[2] 11.8
Inspectors—Tape	2	3.1	----------
Others	7	1.3	----------

[1] Dust exhaust system for this operation.
[2] Sample after 1 hour's operation without exhaust.
[3] Sample taken inside bin during loading.

METHOD OF STUDY

This investigation included a study of atmospheric dust concentrations in the factory workrooms and a study of the exhaust systems used to remove asbestos dust.

Eighty-two atmospheric dust samples were collected at the workers' breathing level with the impinger dust sampling apparatus (*3*). Sixty-nine of these represented present working conditions and 13 represented conditions while exhaust apparatus had been turned off for 1 hour. A collecting medium containing 25 percent ethyl alcohol in distilled water was found to prevent flocculation without causing excessive evaporation in either the sampling flasks or the counting

cells. All samples were counted the day after collection. Owing to the low dust concentrations encountered, most of the samples represented the dust in from 20 to 30 cubic feet of air. Samples were diluted with distilled water and counted according to the light-field technique described by Bloomfield and DallaValle (*3*). A micrometer eyepiece having an engraved square equivalent to one-fourth the standard Whipple square was used in counting. Since it is customary to count only one quadrant of the Whipple field, the same volume of sample (0.25 cubic millimeter) per field was counted (*7*).

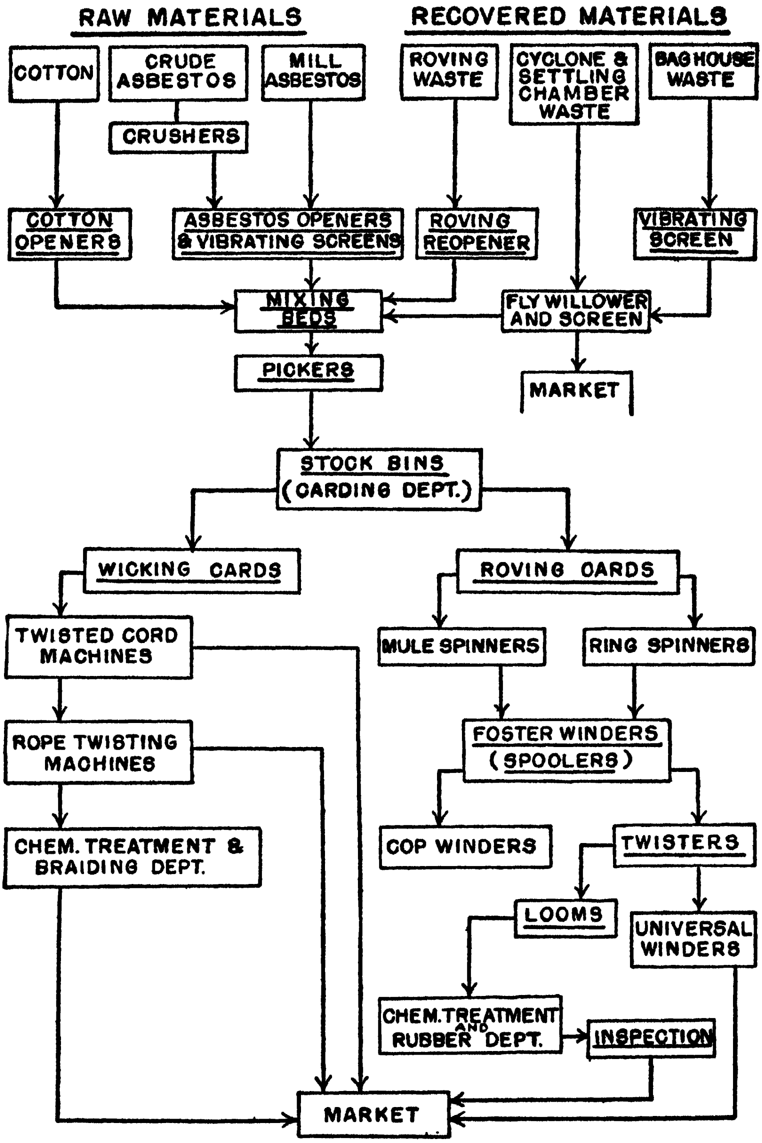
The quantities of air removed through the various exhaust systems were calculated from pitot tube measurements of center-line velocities in the pipe lines (*4*). Average exhaust rates per process are listed in table 2 and discussed a little later in the description of exhaust systems. Entrance velocities at open hoods were measured with an Alnor velometer and checked with a vane anemometer. Most of the hoods were of the enclosed type designed to exhaust only enough air to prevent the escape of asbestos dust into the workroom. Where individual measurements were impractical, air volumes exhausted through each hood were calculated from measurements of main-line velocities. Whenever differences in exhaust volumes were noted between similar hoods on the same operation, the average value is given.

DESCRIPTION OF PROCESSES AND DUST CONTROL MEASURES

Asbestos is received in burlap bags containing 100 pounds of fiber. Cotton is received in standard bales. These are the only raw materials used in the preparation of asbestos yarn at this plant. Unloading, storage, and transportation of the packed raw materials were not hazardous occupations. The progress of the material from raw fiber to completed fabric is shown by means of a flow sheet (fig. 1). Individual processes and the measures for dust control are described below.

PREPARATION DEPARTMENT

Crushing.—Some of the asbestos fiber arrives at the plant as "precrushed" fiber, but most of the crude fiber has received no treatment other than mining, sorting, and screening. This latter type is hand dumped from the bags into rim-wheel crushers and crushed from 5 to 15 minutes. These crushers have two heavy rollers attached to a radial axle, and revolve on a smooth-surfaced tray in which the asbestos is placed. During the crushing, the asbestos fiber is constantly stirred by revolving scrapers. After being crushed, the fiber is replaced in the bags and carried to the asbestos opener. Crushers were not enclosed or exhausted in any way, but the general ventilation in the preparation department was sufficient to prevent high concentrations of dust near this operation. Crusher men had res-



NOTE: UNDERLINED PROCESSES HAVE DUST EXHAUST SYSTEMS.

FIGURE 1.—Process flow-sheet, asbestos textile plant.

pirators [2] and usually wore them while loading or unloading the crushers. The average exposure of a crusher man tending three crushers was 3.5 M. P. P. C. F.

[2] All employees in the preparation department and all repairmen and janitors were provided with respirators of a type approved by the U. S. Bureau of Mines against high concentrations of fine silica dust.

Asbestos opening and screening.—The crushed fiber is dumped from bags to the floor beside the asbestos openers and lifted into the feed lattice hopper with wooden hand forks. Two openers of different design were in operation, but the method of exhaust hooding was the same on both. (See schematic design, fig. 2.) The feed lattice hopper was partially enclosed and exhausted at the top (hood A). A second hood exhausted the bottom fly and settled dust from the bottom of the opener (hood B). The opened fiber was picked up by hood C and pneumatically transported to a cyclone separator where the fibers were removed and dropped onto an enclosed vibrating screen. A large portion of the dust and fine fibers entering the asbestos opener

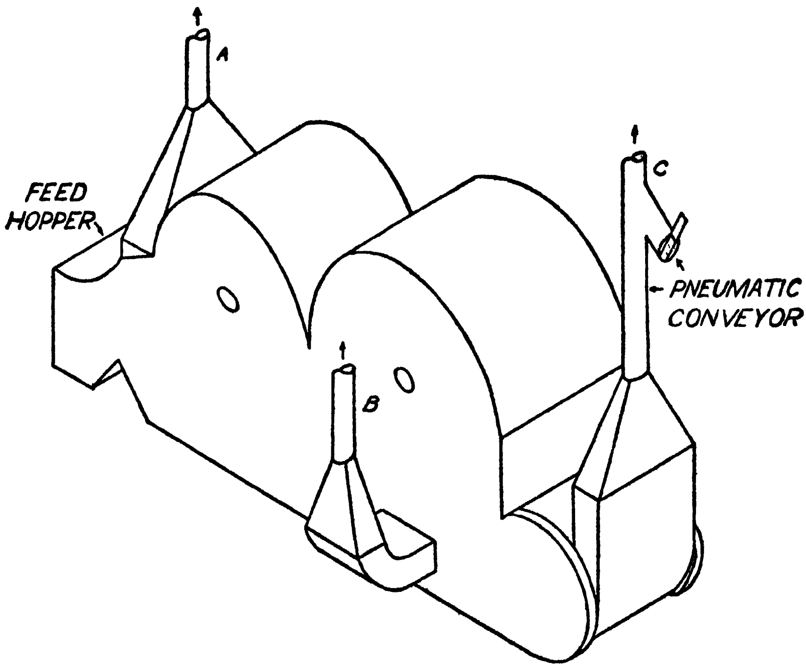


FIGURE 2.—Schematic view of exhaust system applied to an asbestos opener.

was removed by hoods A and B. Clumps of unopened fibers and pieces of rock too heavy to be lifted by the pneumatic fiber conveyor fell onto an enclosed belt conveyor serving both openers, and were carried to the recovery process. (Belt conveyor is not shown in fig. 2.) Exhaust volumes through the hoods were as follows: Hood A, 400 cfm; hood B, 400 cfm; hood C (pneumatic conveyor), 1,800 cfm; conveyor velocity, 2,730 feet per minute.

Each opener had its own cyclone separator and enclosed and exhausted vibrating screen. One screen had two exhaust hoods, one beside the charging hopper drawing 400 cfm and one over the dis-

charge end of the screen and the stock car, drawing 770 cfm. The second screen had one hood only, over the discharge end, drawing 615 cfm. Short fibers and rock particles passing the screens fell through a chute to the enclosed recovery conveyor. Fiber failing to pass these screens dropped into a stock car. Full stock cars were pushed to a platform scale and then to the mixing beds.

The same men charged the openers and filled the stock cars. The average dust exposure of asbestos-opener operators was 3.6 M. P. P. C. F.

Cotton openers.—The best grades of insulation contain very small amounts of cotton, if any; but in all other cases, cotton fiber is mixed with asbestos fiber to improve its spinning qualities. At this plant the batch seldom contained more than 15 percent of cotton by weight but as much as 20 percent cotton was used in lower grade yarns. The two-stage Saco-Lowell cotton opener was provided with exhausts at three points; 770 cfm of air were exhausted through a canopy hood over the feed lattice, 270 cfm from the bottom of the primary opener, and 1,120 cfm from the bottom of the secondary opener. Opened cotton fiber was discharged into stock cars. No samples were taken at the cotton openers, but the operators' average exposure was about 2.4 M. P. P. C. F. (general air, preparation department).

Mixing.—Weighed quantities of asbestos and cotton were placed in alternate layers in the mixing beds. Occasionally, layers of roving waste from the carding room were reopened and added to the bed. Mixing was done in six "exhausted" booths, each 10 feet 2 inches deep by 6 feet 10 inches wide by 6 feet high. Sides of the booths were permanent, while the back consisted of a removable wood and canvas section. Each booth was covered by a pyramid hood 32 inches high, through which approximately 1,025 cubic feet of air per minute per hood were exhausted. The velocity of air motion into these booths averaged 50 feet per minute during bed making and about 30 feet per minute during picker loading. Dust concentration averaged 5.4 M. P. P. C. F. for the bed-making operation.

After a bed had been placed, the picker operator removed the rear partition of the booth and forked the batch into the charging hopper of a picker (fig. 3). The picker machine mixes the fibers in revolving beaters. The four machines represented three different operations and two different types of exhaust systems. The first machine, not in operation during this study, discharged mixed fiber into a stock car. This material was then passed through a second picker for remixing. The second and third machines discharged mixed fiber onto a belt conveyor which transported it to bins in the carding room. The product of the fourth picker was carried to the carding room by a pneumatic conveyor. Each of the first three machines had a hood over the charging lattice, exhausting approximately 500 cfm, a pipe exhausting about 1,650 cfm from the bottom-fly settling chambers

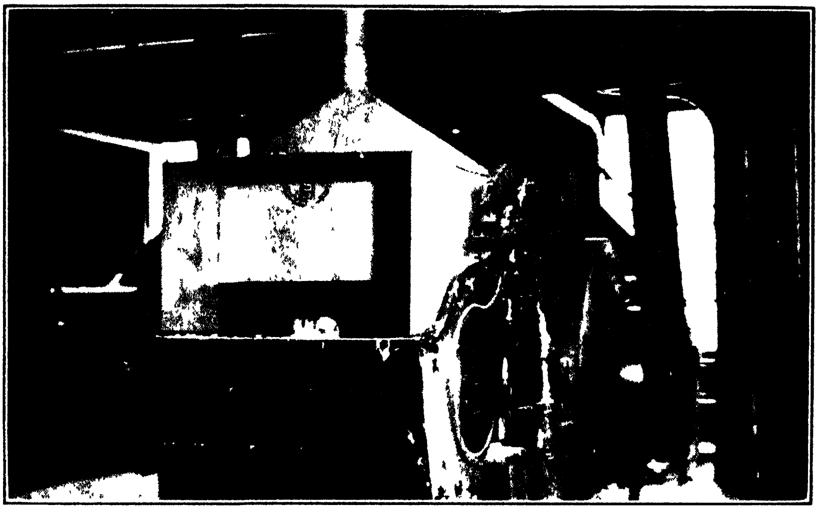


FIGURE 3. Picker mixing machine

FIGURE 4.—Fiber recovery process. Willower and vibrating screens

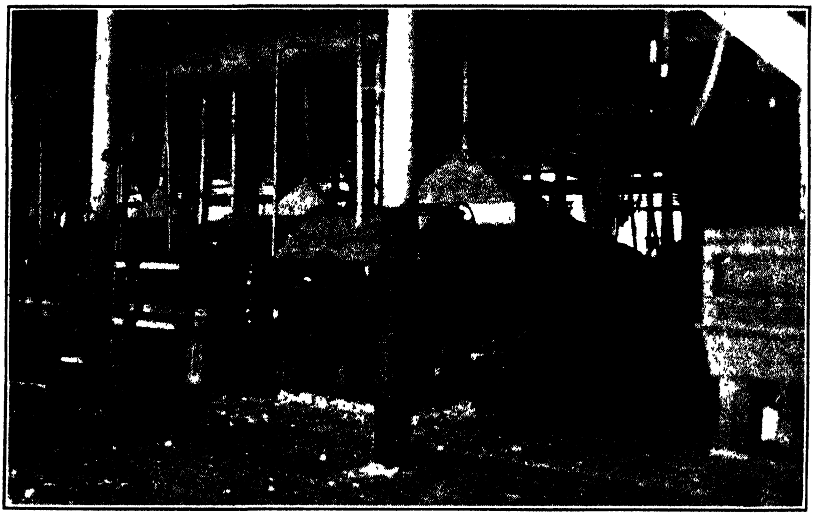


FIGURE 5 - Breaker and roving cards

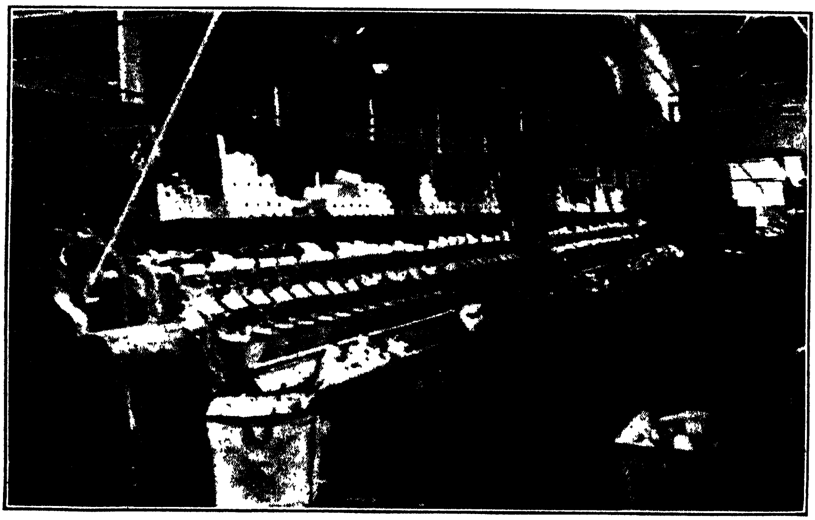


FIGURE 6 —Foster winding machines (spoolers)

under the main picker drum, and a hood over the end of the discharge lattice exhausting about 400 cfm. The fourth picker had the same hood arrangement over the charging lattice but had no bottom-fly exhaust, and the mixed fiber was removed by a pneumatic conveyor exhausting approximately 2,000 cfm of air at a velocity of 2,550 feet per minute. The picker operators wear respirators during the charging operation. Dust concentrations during picker charging varied from 4.0 to 9.5 M. P. P. C. F., averaging about 6.7 M. P. P. C. F.

Recovery processes.—Waste roving from the card room was returned to the preparation department for reopening. The roving reopener was exhausted only from the pit below the last beater, but the 1,780 cfm of air drawn through this hood were sufficient to prevent the escape of dust through the discharge lattice.

The dusty air collected by the exhaust systems in the preparation and carding department was blown into a large settling chamber occupying two stories in the end of a separate building. Air was displaced from this room to a bag house occupying the second floor on the other end of this building. Dust was filtered out by burlap filters stretched on A-frames. The filters were beaten down by hand daily during the noon rest period. The collected dust was removed during the week end shut-down, and stored in bins in the preparation department. Bag-house dust was screened on a completely enclosed and exhausted vibrating screen (background, fig. 4), and the long fibers were removed to a cyclone collector by a pneumatic conveyor. The dust from the settling chamber, the long fibers from the bag-house dust, and fibers separated by cyclones on the exhaust lines from the spooling operation and the weaving department were passed through a fly-willower and vibrating screen (fig. 4). Approximately 250 cfm of air were exhausted from the top of the charging lattice and 620 cfm from the discharge side of the opening drum. Dirt passing the screen dropped onto an inclined tray and was removed by an exhaust hood drawing 730 cfm. Fibers which did not fall through the screen were removed by the hood at the lower end of the screen (1,710 cfm) and pneumatically conveyed to a cyclone collector. Rock and other impurities not picked up by the pneumatic conveyor fell into a waste box below the end of the screen. The market for recovered fiber is limited, and such fiber is usually too soiled for use in high-grade textiles. Consequently only part of the collected dust was passed through this process. Average exposure of operators was estimated at between 3 and 5 M. P. P. C. F.

As a measure of the effectiveness of the dust control system in the preparation department, the exhaust fans were shut off for 1-hour. Pneumatic conveyors remained in operation. Dust concentrations increased steadily to about 50 M. P. P. C. F., at which time the exhaust fans were turned on. The samples taken during this period

were only a partial measure of uncontrolled conditions, since the hoods and enclosures had a definite control value.

While the location and design of hoods were the most important factors in dust control in the preparation department, general ventilation helped prevent high dust concentrations. This department occupied approximately 320,000 cubic feet of space, from which approximately 34,650 cfm of air were exhausted. Consequently 6.5 air changes per hour were produced by mechanical ventilation, which was supplemented by natural ventilation through doors, windows, and roof ventilators. Fortunately heating was not a problem in this plant.

CARDING DEPARTMENT

Mixed fiber from the preparation department was dropped from pneumatic or mechanical conveyors into bins in the carding department. The total volume of exhaust from four bins was 6,850 cfm, the major portion of this air being drawn through the one or two bin doors left open during the loading of carding room stock cars. Dust concentrations as high as 40.4 M. P. P. C. F. were measured inside an active bin while the dust concentration just outside the door of the same bin was only 4.6 M. P. P. C. F. Workers, classed as stock rollers, fork the mixed fiber from the bin into stock cars. This operation is supposed to be performed with both stock car and stock roller outside the bin door. This rule of keeping out of the bins should be strictly enforced. However, stock rollers, wearing respirators, like to push their cars under the chute and then climb into the car and "tread-down" the stock.

The cards are machines having a series of revolving cylinders wound diagonally with strips of leather set with fine, sharp, steel bristles. Carding removes remaining small bits of rock and combs the fibers into a more or less parallel condition to facilitate spinning. At the time of this study, 31 roving card units and 2 wicking cards were being operated. A roving card unit (fig. 5) consisted of two cards, a breaker, or primary card, and a finisher or roving card.

The mixed fiber was fed by hand from the stock car to the feed hopper of the breaker card. The stock roller wore a respirator during this operation. The fiber passed through the breaker card, emerging as a loose blanket or web. It was carried to the finishing card by a lattice conveyor or camel back. The fiber was stripped from the last cylinder of the finisher onto a moving leather apron, where a set of reciprocating rubbers condensed it into loose rovings of unspun yarn. These rovings are wound on long "jack" spools to be taken to the spinning department. The rovings at the extreme ends of the cards cannot be used for spinning because they lack uniform thickness. These rovings are collected by two small hoods and pneumatically conveyed to a collection bin for return to the preparation department.

The exhaust system applied to roving cards is shown schematically in figure 7. The quantity of air exhausted varied from 1,100 cfm to 1,800 cfm on different carding units with an average exhaust of 1,440 cfm per unit. Cards are partially enclosed and only sufficient air is exhausted to prevent the escape of dust.

Each breaker card is exhausted at three points. Hood B exhausts from the top of the feed hopper over the feed apron. This hopper was enclosed and covered, the cover being lifted during filling. About 160 cfm of air were exhausted through the hood. Hood A exhausted the top fly from the enclosure covering the main carding cylinder. Hood

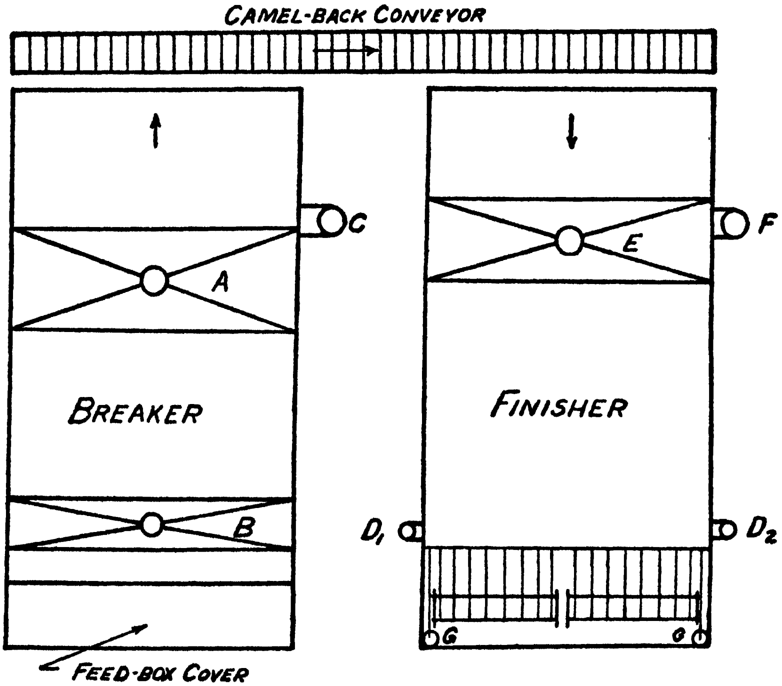


FIGURE 7.—Schematic plan of card exhaust system.

C exhausted the bottom fly from the settling chamber under the carding cylinders. Approximately 285 cfm were exhausted through each of these hoods.

The finishing card had four exhaust connections besides the two small hoods G which removed the waste roving. Hoods E and F correspond to hoods A and C, respectively, on the breaker card, providing an exhaust of approximately 285 cfm each. The doffer card cylinder, doffer combs, and roving apron were exhausted from below, through hoods D^1 and D^2 at 70 cfm each. About 40 cfm were exhausted through each roving collector.

The volumes of air exhausted through each hood were estimated on the basis of pipe areas. Actual volumes showed wide variations on different units.

Single cards were used in the manufacture of asbestos wick and rope, since a thick roving was desired. The wick or rope was twisted from the unspun roving. The wicking cards were exhausted at three points. Approximately 380 cfm of air were drawn from under the feed lattice, 490 cfm were exhausted from the top of the main cylinder cover to remove the top fly, and 550 cfm were exhausted from the bottom-fly settling chamber.

Dust concentrations during carding averaged 1.7 M. P. P. C. F. This was also the average exposure of wicking card operators and wick and rope twisters. Samples taken near the carding department weight scales showed less than 0.5 M. P. P. C. F.

Card rolls were cleaned and ground at night, except in cases of emergency. Cleaning was done with hand scrapers made of strips of card cloth, and the card cylinder was turned by hand. Grinding was done with the usual type of card grinders. The large roll was ground in place in the carding machine. Slightly greater quantities of air were exhausted during grinding due to the decreased loss of head resulting from removal of the wooden card covers. The small card cylinders were ground in a grinding frame. These frames were partially enclosed and covered with a canopy hood exhausting 2,330 cfm per grinder. Dust concentrations averaged 0.65 M. P. P. C. F. during grinding.

A special run of a group of carding machines made with all exhaust ventilation turned off and windows closed showed that dust concentrations steadily increased. At the end of 1 hour the concentration was 62.4 M. P. P. C. F. in the air. Under normal operating conditions about 64,000 cfm of air are exhausted from the carding department. This is equivalent to about 5.5 air changes per hour, disregarding natural ventilation through windows on all four sides of the room.

Spinning, twisting, and winding.—The yarn as roving is twisted or spun into compact threads on either mule or ring spinning frames. In this plant most of the spinning was done on mule spinners. The spun thread was transferred from the spinning spindles to spools, on Foster winding machines (spoolers). Spooled thread to be used as filler (or woof) in woven cloth was rewound on a cop winder into cops which will fit into the loom shuttles. The remaining spooled thread was respooled on twisters which twist several threads into a yarn. The number of strands used determined the size of yarn. Both plain and metallic yarns were twisted. Metallic yarn contains one or more strands of fine wire. Part of the twisted yarn was used in cloth weaving while the remaining yarn was rewound on Universal winding frames for the market.

Mule spinning was separated from other operations in this department by partial partitions. Natural ventilation was good and no exhaust systems were used. The average dust concentration was 0.85 M. P. P. C. F. with a maximum of 1.3 M. P. P. C. F. recorded.

Ring spinning, cop winding, and Universal winding machines were located in the same room with the twisting machines. Average exposures in the first three operations, which were not themselves especially dusty, were due to dust from the twisting operation. With the exception of a trial exhaust system on one twister, the remaining machines were not provided with exhaust. The trial system was reported to be satisfactory and is to be installed on all twisting

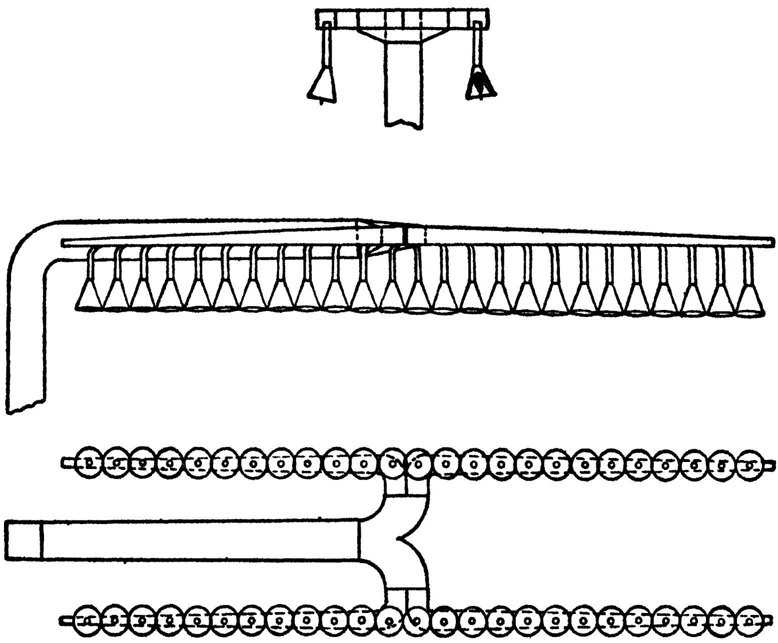


FIGURE 8.—Schematic views of exhaust system applied to Foster winders

machines. In this system, the bottom of the twisting frame was enclosed and a total of 1,700 cfm of air per machine was drawn downward past the twisting yarns and through five conical hoods distributed along a central exhaust duct.

Average dust concentrations at the various operations in this room were ring spinning, 5.0 M. P. P. C. F.; cop winding, 6.9 M. P. P. C. F.; Universal winding, 2.8 M. P. P. C. F.; and twisting, 11.0 M. P. P. C. F., with a maximum of 18.8 M. P. P. C. F. recorded beside a twisting frame. No accurate measurements of the efficiency of the exhaust system on the single exhausted twister could be secured, but simultaneous samples on both sides of this frame showed a dust

concentration of 18.0 M. P. P. C. F. on the side toward the unexhausted twisting frames and a concentration of 6.3 M. P. P. C. F. on the other side.

Four Foster winders (spoolers) were partially separated from the other operations by partitions (fig. 6). The exhaust system consisted of an individual conical hood around each spindle holder (fig. 8). Approximately 46.5 cfm were exhausted through each hood, or a total of 9,270 cfm through the 200 hoods on the 4 spooling frames. Dust concentrations at the spoolers averaged 2.9 M. P. P. C. F. and increased to 9.6 M. P. P. C. F. within 30 minutes after the ventilation had been shut off.

WEAVING AND INSPECTION

Cloth, tape, listing, and brake bands were woven on different types of looms. In this plant, exhaust systems had been applied to the dry cloth looms, since these were considered to be the most important source of dust. The dust control program calls for installation of exhaust systems on dry tape, listing, and brake-band looms. At present these operations are mainly performed wet or partially wet. Brake-band looms were not in operation during this study. Significant differences could not be noted between dust samples collected around the various tape and listing looms. Dust concentrations ranged from 1.2 to 4.0 M. P. P. C. F. and averaged 3.0 M. P. P. C. F.

Nineteen cloth looms were in operation in this department. One of these was a wet loom not provided with exhaust hoods, 4 were dry looms provided with exhaust hoods, and the other 14 were so provided but could be operated either wet or dry. A loom without exhaust hoods is shown in figure 9. The exhaust system is shown schematically in figure 11. A double exhaust hood drew air from under the warp while a second hood was attached to the top of the loom lay with exhaust ducts running down the side of each picker arm to an airtight swing joint at the bottom. The openings in the loom-lay hood consisted of four slots nine inches long by 1 inch wide extending over a space of 4 feet across the woven fabric at right angles to the warp. A total volume of approximately 10,500 cfm of air was exhausted from the 18 hooded looms. This averaged about 580 cfm per loom; but since it was seldom necessary to operate more than 10 dry looms at one time, the average quantity of air exhausted was close to 1,000 cfm per loom. Exhaust dampers were provided on all looms, and a sufficient number to balance the system are closed on wet or idle looms. The average dust exposure of a weaver operating a dry loom with exhaust was 0.7 M. P. P. C. F., while the average exposure in wet weaving without exhaust was 2.6 M. P. P. C. F. Samples taken beside a dry loom without exhaust showed dust concentrations of 9.6 M. P. P. C. F.

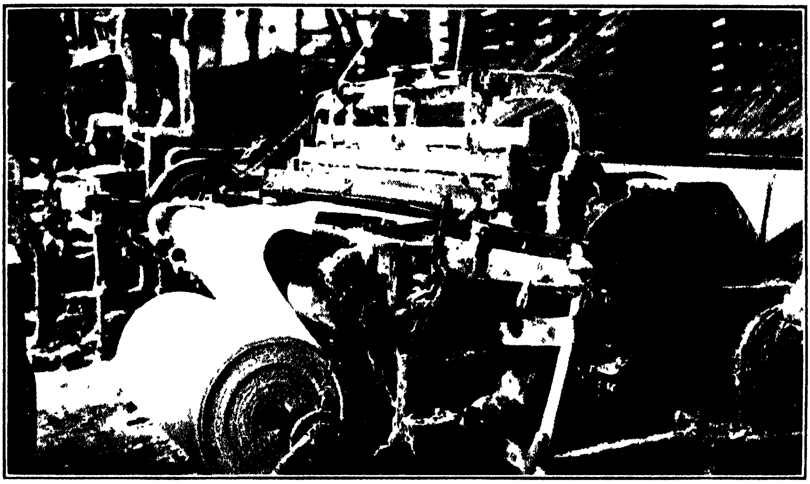


FIGURE 9 Unexhausted broad loom

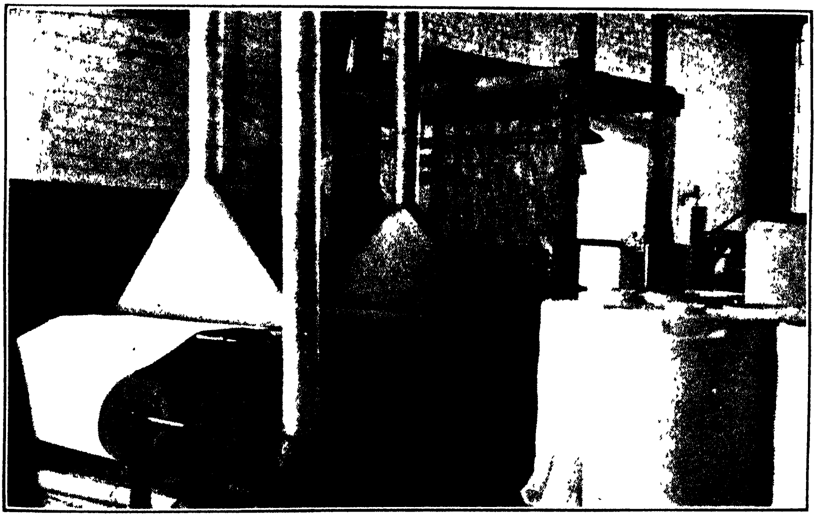


FIGURE 10 —Table for inspecting, calendering, and brushing woven cloth

after 45 minutes. Average dust concentrations during dry weaving have been shown as 49.7 M. P. P. C. F. (*5*).

Woven cloth was inspected, brushed, and calendered on the inspection table shown in figure 10. Each of the power-driven brushes was

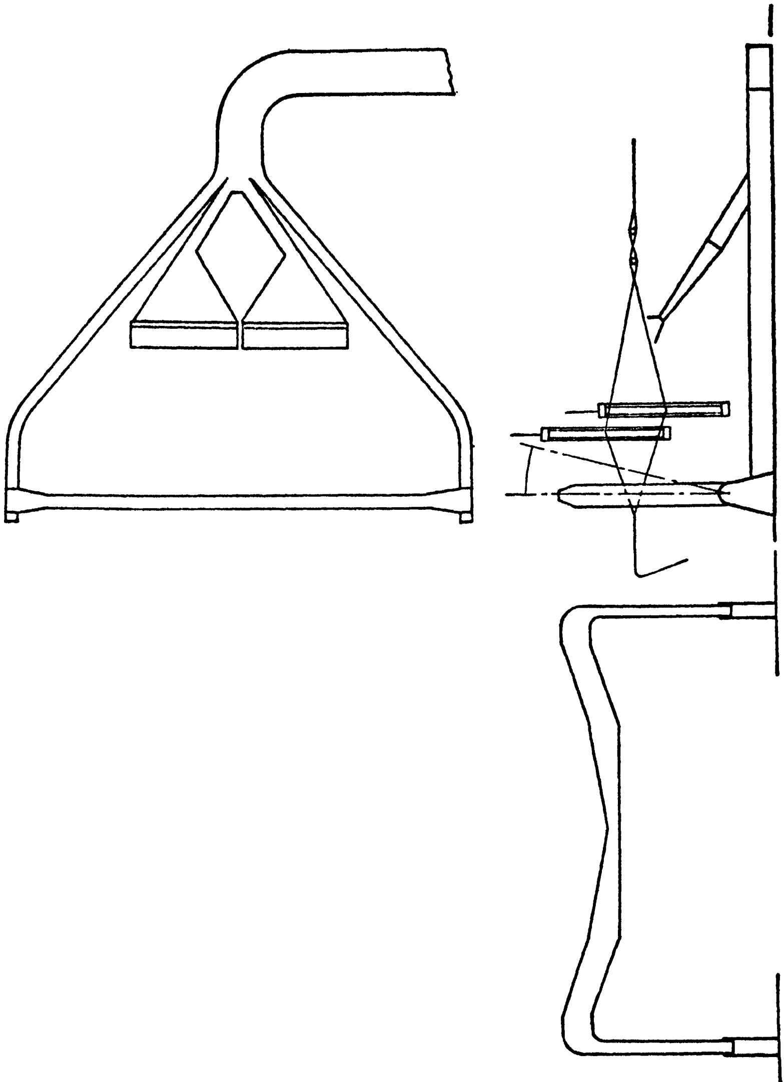


FIGURE 11.—Schematic views of exhaust system applied to broad looms.

partially enclosed and exhausted. Approximately 750 cfm of air were drawn through each of the two hoods at the front of the table and about 200 cfm were drawn through the cleaning hood at the back of

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the table. Dust concentrations during inspection averaged 0.5 M. P. P. C. F. A sample taken while a roll of fabric was passed across the table without benefit of exhaust showed a dust concentration of 11.8 M. P. P. C. F.

Doffing, inspection, and calendering of tape and listing were hand operations and were not provided with exhaust. Dust concentrations of 5.0 M. P. P. C. F. were recorded during these operations but the exposure was intermittent.

Creelers had an average exposure of about 1.3 M. P. P. C. F. while placing spools and threading looms.

An exhaust of 12,200 cfm of air was provided in the weaving department, corresponding to approximately three air changes per hour. In cold weather, warm air was distributed through the department from a plenum system, while in warm weather natural ventilation was secured through use of windows on all four sides of the department.

OTHER OPERATIONS

Other operations in this plant consisted of processes in which the yarn was chemically treated and fabricated, or processes for chemically treating or rubberizing fabricated cloth. No potential asbestos hazard was associated with these processes, with the exception of one braiding machine used to make large diameter asbestos tubing. This machine was covered with a conical canopy hood about 6 feet in diameter, which provided an exhaust of approximately 200 cfm of air. A sample taken beside this machine showed a dust concentration of 0.4 M. P. P. C. F. at the operators' breathing level.

TABLE 2.—*Volumes of air exhausted per machine in various operations in an asbestos textile plant*

Operation	Connections	Total volume of air exhausts per minute (cu ft/min)	Dust concentration with exhaust, M.P.P.C.F.	Dust concentration without exhaust, M.P.P.C.F.
Asbestos opener	[1]2	625–1,000	3.5	[2]11.1–36.0
Vibrating screen	1	700		
Cotton opener	3	2,160	----------	----------
Mixing beds	1	1,025	5.4	[3]3.1–10.6
Picker	3	2,570	6.7	[2]34.3–74.3
Roving reopener	1	1,780	----------	----------
Fly willower and screen	[1]3	1,600	----------	----------
Roving cards.				
Breaker (primary)	3	1,420		
Finisher	4	1,440	1.7	62.4
Wicking card	3	1,420		
Card grinders	1	2,330	.7	----------
Foster winders (spoolers) [4]	[4]1	2,225	2.9	[2]13.1
Twisters	1	1,700	----------	11.0
Weaving (broad looms)	2	1,300	.7	[2]49.7
Brusher—Calenderer	3	1,650	.5	11.8

[1] Equipped with pneumatic conveyor—exhaust through conveyor not included.
[2] Unpublished data, other plants (J. M. DallaValle, U. S. P. H. S.)
[3] Fulton, et al. Ref. (2)
[4] Individual cone for each spindle connected to exhaust manifold.

SUMMARY

Table 2 gives a summary of the operations provided with exhaust, listing the number of exhaust ducts and the rate of ventilation per machine, as well as the average dust concentrations to which operators are exposed. Average dust concentrations measured near corresponding operations without exhaust are tabulated to show the effectiveness of the control methods which have been described.

CONCLUSION

This study of actual results secured by a dust control program in an asbestos fabricating plant is presented as an example of engineering control of an industrial hazard. Adequate data have not yet been published to justify the determination of threshold limits of dustiness which will produce asbestosis in any definite period of time. In the absence of such threshold values it is not possible to determine permissible limits of dustiness on a medical basis. Nevertheless, any appreciable decrease in the amount of asbestos dust will cause a decrease in the incidence and severity of the resulting asbestosis. The elimination of all the dust in an industrial workroom is rarely necessary from a physiological standpoint and usually economically impracticable. Consequently, actual atmospheric conditions in an industry resulting from the application of practical methods of dust control can be used as temporary standards by that industry (*6*).

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DEATHS DURING WEEK ENDED NOV. 6, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov. 6, 1937	Correspond-ing week, 1936
Data from 86 large cities of the United States:		
Total deaths	7,568	8,282
Average for 3 prior years	7,790	
Total deaths, first 44 weeks of year	378,395	378,537
Deaths under 1 year of age	452	578
Average for 3 prior years	538	
Deaths under 1 year of age, first 44 weeks of year	24,280	24,524
Data from industrial insurance companies		
Policies in force	69,899,046	68,553,251
Number of death claims	10,571	10,197
Death claims per 1,000 policies in force, annual rate	7.9	7.8
Death claims per 1,000 policies, first 44 weeks of year, annual rate	9.8	9.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (------) indicate that cases or deaths may have occurred although none was reported

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 13, 1937, and Nov. 14, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov 13, 1937	Week ended Nov 14, 1936	Week ended Nov 13, 1937	Week ended Nov 14, 1936	Week ended Nov 13, 1937	Week ended Nov 14, 1936	Week ended Nov 13, 1937	Week ended Nov 14, 1936
New England States								
Maine	2	2	------	1	35	10	0	0
New Hampshire	------	------	4	------	65	3	0	0
Vermont	4	------	------	------	107	1	0	0
Massachusetts	1	9	------	------	48	103	0	2
Rhode Island	1	2	------	------	------	54	0	2
Connecticut	4	1	3	5	7	22	0	0
Middle Atlantic States.								
New York	28	32	[1] 10	[1] 7	70	97	6	12
New Jersey	29	13	16	6	162	50	3	1
Pennsylvania	54	50	------	------	899	44	4	3
East North Central States:								
Ohio	56	57	23	32	237	16	3	4
Indiana	33	39	29	13	24	4	2	1
Illinois	49	43	10	19	260	11	3	6
Michigan	23	25	------	2	41	34	1	1
Wisconsin	4	5	36	31	59	21	0	0
West North Central States:								
Minnesota	12	14	------	1	6	41	0	1
Iowa	5	4	------	4	1	2	2	2
Missouri	55	32	36	56	436	4	2	0
North Dakota	------	5	------	6	1	1	0	0
South Dakota	6	------	------	------	------	4	1	0
Nebraska	6	5	1	------	2	3	0	1
Kansas	18	55	2	5	4	2	0	1
South Atlantic States:								
Delaware	------	1	------	------	------	5	0	0
Maryland [2]	25	26	9	3	7	28	5	5
District of Columbia	6	11	------	------	1	------	0	3
Virginia	66	60	------	------	35	23	5	7
West Virginia	23	35	28	59	85	23	5	3
North Carolina [3]	86	123	4	7	155	34	1	4
South Carolina [3]	21	19	220	313	5	6	0	2
Georgia [3]	37	64	------	------	------	------	2	0
Florida [3]	18	6	6	3	5	------	3	2

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 13, 1937, and Nov. 14, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov 13, 1937	Week ended Nov 14, 1936	Week ended Nov 13, 1937	Week ended Nov. 14, 1936	Week ended Nov. 13, 1937	Week ended Nov. 14, 1936	Week ended Nov. 13, 1937	Week ended Nov 14, 1936
East South Central States:								
Kentucky	38	29	2	15	25	7	6	6
Tennessee [3]	24	50	50	52	33	3	0	6
Alabama [3]	44	65	66	27	1	1	4	1
Mississippi [2]	25	19					0	1
West South Central States:								
Arkansas	30	16	19	12	11	1	1	1
Louisiana	19	17	16	10		8	0	1
Oklahoma [4]	25	17	25	42	3	4	0	0
Texas [3]	65	30	170	121	19	15	2	3
Mountain States:								
Montana	2	2		5	2	4	0	0
Idaho	2		3	4	17	7	0	3
Wyoming					1	4	0	0
Colorado	8	9			13	2	0	1
New Mexico	8	4	2		26	5	0	0
Arizona	10	5	37	58	2	37	0	0
Utah [2]	54				59	13	1	2
Pacific States:								
Washington	5		1		18	6	0	0
Oregon	13	2	18	20	14	7	1	2
California	33	61	21	31	28	19	4	3
Total	1,077	1,064	867	970	3,029	789	67	93
First 45 weeks of year	22,738	23,249	281,108	146,089	256,563	272,921	4,861	6,639

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Nov 13, 1937	Week ended Nov. 14, 1936	Week ended Nov 13, 1937	Week ended Nov 14, 1936	Week ended Nov. 13, 1937	Week ended Nov 14, 1936	Week ended Nov 13, 1937	Week ended Nov. 14, 1936	Week ended Nov 13, 1937
New England States:									
Maine	0	0	13	21	0	0	0	0	24
New Hampshire	0	0	2	4	0	0	0	0	3
Vermont	0	0	14	7	0	0	0	1	27
Massachusetts	2	0	125	105	0	0	3	0	79
Rhode Island	1	0	25	14	0	0	0	1	8
Connecticut	2	0	47	38	0	0	1	0	16
Middle Atlantic States:									
New York	5	7	266	271	0	0	9	14	397
New Jersey	3	1	54	53	0	0	5	5	75
Pennsylvania	4	6	331	324	0	0	21	44	
East North Central States:									
Ohio	1	10	317	270	0	1	9	30	181
Indiana	0	0	147	161	20	1	3	1	26
Illinois	4	25	382	286	9	1	12	24	92
Michigan	3	5	354	231	1	1	2	9	
Wisconsin	4	1	145	203	3	1	1	1	154
West North Central States:									
Minnesota	4	2	94	121	13	2	0	1	80
Iowa	3	2	135	67	20	6	5	7	34
Missouri	2	6	204	103	15	1	5	23	71
North Dakota	0	2	51	57	30	10	0	3	20
South Dakota	3	0	8	37	11	7	3	2	45
Nebraska	1	1	21	33	0	0	1	0	7
Kansas	1	4	98	90	4	1	1	6	46
South Atlantic States:									
Delaware	0	0	10	7	0	0	0	1	4
Maryland [2]	0	3	72	71	0	0	4	8	65
District of Columbia	0	0	9	12	0	0	0	0	4
Virginia	1	1	35	53	0	0	10	7	47
West Virginia	0	0	100	72	0	0	4	7	83
North Carolina [3]	2	0	72	94	0	0	11	4	160

Footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for week ended Nov. 13, 1937, and Nov. 14, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Nov. 13, 1937	Week ended Nov 14, 1936	Week ended Nov 13, 1937	Week ended Nov 14, 1936	Week ended Nov 13, 1937	Week ended Nov 14, 1936	Week ended Nov 13, 1937	Week ended Nov. 14, 1936	Week ended Nov. 13, 1937
South Atlantic States—Con.									
South Carolina [3]	1	1	12	8	0	0	2	2	38
Georgia [3]	2	7	36	32	0	0	18	12	16
Florida [3]	1	1	5	2	2	0	0	0	5
East South Central States:									
Kentucky	0	3	107	47	2	0	8	19	67
Tennessee [3]	0	10	42	68	0	1	10	22	33
Alabama [3]	1	1	29	31	0	0	1	6	6
Mississippi [2]	5	3	20	26	4	0	5	3	-------
West South Central States:									
Arkansas	3	7	34	19	3	0	13	14	51
Louisiana	5	2	11	17	1	1	9	6	3
Oklahoma [4]	1	25	68	23	4	1	19	9	340
Texas [3]	9	3	101	47	4	1	50	10	128
Mountain States:									
Montana	1	0	37	50	18	8	3	5	15
Idaho	0	0	33	31	11	1	0	7	11
Wyoming	0	1	6	15	2	1	0	0	23
Colorado	0	10	19	42	2	1	0	0	3
New Mexico	1	1	36	14	0	0	8	5	53
Arizona	0	1	7	29	0	0	1	1	-------
Utah [2]	0	0	50	13	1	1	0	0	14
Pacific States.									
Washington	5	1	45	46	20	0	2	1	75
Oregon	4	0	31	37	30	0	4	0	34
California	14	8	133	211	1	0	7	6	221
Total	99	161	3, 993	3, 613	240	48	270	327	2, 839
First 45 weeks of year	9, 102	4, 055	191, 424	202, 398	9, 101	6, 416	13, 879	13, 247	-------

[1] New York City only

[2] Week ended earlier than Saturday

[3] Typhus fever, week ended Nov 13, 1937, 39 cases, as follows: North Carolina, 2; South Carolina, 3; Georgia, 13; Florida, 2, Tennessee, 1; Alabama, 13, Texas, 5

[4] Figures for 1936 are exclusive of Oklahoma City and Tulsa

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
September 1937										
Colorado	4	33	-------	-------	45	-------	95	54	8	9
Puerto Rico	3	28	198	3, 212	48	-------	0	-------	0	20
October 1937										
Alabama	8	183	138	700	11	16	9	88	9	25
Arkansas	6	135	70	763	19	29	37	96	1	75
Idaho	1	4	22	1	38	-------	4	92	32	14
Indiana	3	113	124	-------	55	-------	19	576	10	16
Iowa	4	14	1	-------	12	-------	46	309	20	33
Michigan	8	103	4	26	135	-------	63	1, 157	1	26
New Jersey	2	39	31	4	305	-------	35	203	0	17
North Carolina	6	504	16	204	276	34	11	301	1	46
Pennsylvania	13	109	-------	-------	1, 413	1	50	821	0	121
Tennessee	13	209	92	195	128	13	18	208	23	94
Wyoming	1	-------	-------	-------	12	-------	2	39	0	4

Summary of monthly reports from States—Continued

September 1937

	Cases
Colorado:	
Chicken pox	24
Dysentery	2
Encephalitis, epidemic or lethargic	2
Mumps	12
Undulant fever	1
Whooping cough	50
Puerto Rico.	
Chicken pox	47
Dysentery	16
Filariasis	1
Leprosy	1
Mumps	5
Puerperal septicemia	1
Tetanus	7
Tetanus, infantile	1
Trachoma	1
Vincent's infection	1
Whooping cough	59

October 1937

	Cases
Botulism.	
Tennessee	1
Chicken pox:	
Alabama	35
Arkansas	13
Idaho	56
Indiana	93
Iowa	106
Michigan	610
New Jersey	551
North Carolina	198
Pennsylvania	1,013
Tennessee	41
Wyoming	42
Conjunctivitis:	
Idaho	6
Dysentery:	
Alabama (amoebic)	3
Arkansas (amoebic)	2
Arkansas (bacillary)	6
Iowa (bacillary)	2
Michigan (amoebic)	8
Michigan (bacillary)	1
New Jersey (amoebic)	1
New Jersey (bacillary)	1
Pennsylvania (amoebic)	1
Pennsylvania (bacillary)	8
Tennessee (amoebic)	8
Tennessee (bacillary)	27

October 1937—Continued

	Cases
Encephalitis, epidemic or lethargic:	
Alabama	2
Idaho	8
Indiana	1
Iowa	2
Michigan	1
New Jersey	8
Pennsylvania	3
German measles:	
Iowa	3
Michigan	41
New Jersey	26
North Carolina	15
Pennsylvania	43
Tennessee	1
Wyoming	3
Impetigo contagiosa:	
Michigan	11
Tennessee	9
Mumps	
Alabama	33
Arkansas	5
Idaho	56
Indiana	19
Iowa	63
Michigan	221
New Jersey	141
Pennsylvania	730
Tennessee	38
Wyoming	17
Ophthalmia neonatorum:	
Alabama	1
Arkansas	1
New Jersey	11
Pennsylvania	4
Tennessee	3
Paratyphoid fever:	
Michigan	3
New Jersey	8
Tennessee	11
Puerperal septicemia:	
Tennessee	1
Rabies in animals:	
Alabama	48
Indiana	43
Michigan	7
New Jersey	9
Rocky Mountain spotted fever.	
Idaho	1
North Carolina	1

October 1937—Continued

	Cases
Septic sore throat:	
Arkansas	9
Idaho	7
Iowa	2
Michigan	41
North Carolina	20
Tennessee	17
Wyoming	3
Tetanus:	
Alabama	6
Michigan	8
New Jersey	3
Tennessee	2
Trachoma	
Arkansas	5
Michigan	1
Tennessee	2
Tularaemia.	
Idaho	1
Indiana	1
Michigan	1
Typhus fever.	
Alabama	67
North Carolina	5
Undulant fever:	
Alabama	6
Arkansas	2
Idaho	3
Indiana	5
Iowa	7
Michigan	1
New Jersey	5
Pennsylvania	5
Tennessee	1
Vincent's infection:	
Idaho	3
Michigan	28
Tennessee	6
Whooping cough.	
Alabama	66
Arkansas	51
Idaho	55
Indiana	107
Iowa	188
Michigan	680
New Jersey	311
North Carolina	401
Pennsylvania	1,060
Tennessee	183
Wyoming	56

CASES OF VENEREAL DISEASES REPORTED FOR SEPTEMBER 1937

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama	1,602	5.59	429	1.50
Arizona [1]				
Arkansas	855	4.23	328	1.62
California	1,825	3.01	1,897	3.13
Colorado [1]				
Connecticut	266	1.53	181	1.04
Delaware [1]				
District of Columbia	209	3.38	214	3.46
Florida [2]	1,627	9.91	194	1.18
Georgia	1,515	4.95	370	1.21
Idaho	32	66	47	.97
Illinois	1,919	2.45	1,526	1.95
Indiana	296	.86	70	.20
Iowa [2]	446	1.75	284	1.12
Kansas	132	70	76	.40
Kentucky	589	2.04	403	1.40
Louisiana	887	4.18	171	.81
Maine	55	.64	56	.66
Maryland	793	4.74	379	2.26
Massachusetts	427	96	510	1.15
Michigan	813	1.76	674	1.41
Minnesota	320	1.21	358	1.36
Mississippi	1,968	9.80	2,030	13.10
Missouri	370	.93	257	.65
Montana [2]	55	1.04	69	1.30
Nebraska	83	.61	98	.72
Nevada [3]				
New Hampshire	15	30	9	.18
New Jersey	700	1.62	359	.83
New Mexico	95	2.25	38	90
New York	1,432	1.11	837	65
North Carolina	3,314	9.59	578	1.67
North Dakota	29	41	57	81
Ohio [4]	1,521	2.27	482	.72
Oklahoma [2]	502	1.99	428	1.69
Oregon	102	1.00	242	2.38
Pennsylvania [4]	1,672	1.65	294	.29
Rhode Island	67	.98	58	85
South Carolina [1]				
South Dakota	34	.49	35	.51
Tennessee	604	2.42	353	1.23
Texas	649	1.06	227	.37
Utah [1]				
Vermont	12	.32	44	1.16
Virginia	990	3.71	348	1.30
Washington	281	1.71	378	2.30
West Virginia	284	1.55	167	.91
Wisconsin	48	.17	149	51
Wyoming [3]				
Total	29,555	2.38	16,301	1.31

See footnotes at end of table.

CASES OF VENERAL DISEASES REPORTED FOR SEPTEMBER 1937

Reports from cities of 200,000 population or over

Akron, Ohio [1]	----	----	----	----
Atlanta, Ga.	193	6.72	135	4.70
Baltimore, Md.	437	5.30	251	3.04
Birmingham, Ala.	207	7.33	125	4.43
Boston, Mass.	194	2.45	198	2.50
Buffalo, N. Y.	116	1.96	82	1.39
Chicago, Ill.[4]	804	2.25	909	2.55
Cincinnati, Ohio	194	4.16	77	1.65
Cleveland, Ohio	268	2.88	100	1.07
Columbus, Ohio	91	2.98	33	1.08
Dallas, Tex.	214	7.39	67	2.31
Dayton, Ohio	83	3.95	18	.86
Denver, Colo.	63	2.12	32	1.08
Detroit, Mich.	361	2.09	322	1.86
Houston, Tex.[1]	----	----	----	----
Indianapolis, Ind.	18	.48	26	.69
Jersey City, N. J.[1]	----	----	----	----
Kansas City, Mo.	82	1.95	15	.36
Los Angeles, Calif.	558	3.90	520	3.63
Louisville, Ky.	229	7.07	143	4.41
Memphis, Tenn.	242	9.06	115	4.31
Milwaukee, Wis.[1]	----	----	----	----
Minneapolis, Minn.	90	1.85	107	2.20
Newark, N. J.	262	5.65	177	3.82
New Orleans, La.[1]	----	----	----	----
New York, N. Y.	7,187	9.84	1,805	2.47
Oakland, Calif.	37	1.22	29	.96
Omaha, Nebr.	41	1.86	38	1.72
Philadelphia, Pa.	510	2.57	----	----
Pittsburgh, Pa.	114	1.67	43	.63
Portland, Oreg.[3]	----	----	----	----
Providence, R. I.	37	1.43	38	1.47
Rochester, N. Y.	43	1.28	78	2.31
St. Louis, Mo.	276	3.30	193	2.31
St. Paul, Minn.	22	.78	36	1.28
San Antonio, Tex.	130	5.17	62	2.47
San Francisco, Calif.	211	3.15	275	4.10
Seattle, Wash.	121	3.19	166	4.37
Syracuse, N. Y.	84	3.85	57	2.62
Toledo, Ohio	154	5.06	57	1.87
Washington, D. C.	209	3.38	214	3.46

[1] No report for current month.
[2] Incomplete
[3] Not reporting
[4] Only cases of syphilis in the infectious stage are reported.
[5] Figures taken from "Monthly Report, Form VM-684"

WEEKLY REPORTS FROM CITIES

City reports for week ended Nov. 6, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	317	164	35	289	506	1,034	7	352	49	834	--------
Current week [1]	180	109	33	875	447	794	20	348	37	769	--------
Maine:											
Portland	0	------	0	0	3	3	0	0	0	18	24
New Hampshire:											
Concord	0	------	0	1	0	1	0	1	0	0	9
Manchester	0	------	1	0	0	3	0	0	0	0	16
Nashua	0	------	--------	0	------	0	0	------	0	4	9
Vermont:											
Barre	0	------	0	31	0	0	0	2	0	0	5
Burlington	0	------	0	0	0	0	0	0	0	3	8
Rutland	0	------	0	1	0	2	0	0	0	1	6
Massachusetts:											
Boston	0	------	1	24	13	38	0	11	1	3	205
Fall River	2	------	0	0	1	2	0	1	0	23	24
Springfield	0	------	0	0	1	5	0	1	0	10	23
Worcester	0	------	0	0	3	0	0	1	0	4	50
Rhode Island:											
Pawtucket	0	------	0	1	0	2	0	1	0	0	9
Providence	3	1	0	0	1	8	0	3	0	18	52
Connecticut:											
Bridgeport	0	------	0	0	0	0	3	2	0	1	29
Hartford	1	------	0	0	1	10	0	0	0	3	33
New Haven	0	------	0	0	1	1	0	0	0	0	40
New York:											
Buffalo	0	------	1	3	6	8	0	9	0	14	140
New York	26	16	4	32	69	58	0	77	9	88	1,278
Rochester	1	------	0	2	2	1	0	1	0	2	63
Syracuse	0	------	0	1	1	16	0	1	0	9	44
New Jersey:											
Camden	1	------	0	0	2	4	0	0	0	0	33
Newark	1	3	0	1	3	4	0	2	1	22	101
Trenton	0	------	0	84	3	2	0	0	0	0	37
Pennsylvania:											
Philadelphia	5	1	1	11	36	30	0	22	10	38	461
Pittsburgh	2	8	3	170	14	35	0	6	0	20	158
Reading	0	------	0	6	2	7	0	1	0	0	29
Scranton	1	------	--------	1	------	2	0	------	0	0	--------
Ohio:											
Cincinnati	------	------	--------	------	------	------	------	------	------	------	--------
Cleveland	8	10	0	41	15	46	0	6	1	28	158
Columbus	3	------	0	1	10	12	0	6	0	0	96
Toledo	5	1	0	1	0	7	0	4	0	12	71
Indiana:											
Anderson	0	------	0	0	3	9	0	4	0	9	15
Fort Wayne	0	------	0	2	0	0	0	0	0	0	26
Indianapolis	7	------	0	2	8	12	0	6	1	19	83
Muncie	1	------	0	0	1	0	0	0	0	0	13
South Bend	0	------	0	0	0	1	0	1	0	1	13
Terre Haute	2	------	0	0	0	1	1	0	0	0	25
Illinois:											
Alton	0	------	0	31	0	2	0	0	1	0	11
Chicago	14	9	5	76	25	92	0	38	0	31	619
Elgin	0	------	0	0	0	1	0	0	0	0	11
Moline	0	------	0	0	1	3	0	0	0	5	10
Springfield	0	------	0	1	1	2	0	0	1	0	18
Michigan:											
Detroit	7	------	0	26	24	57	0	18	2	50	260
Flint	5	------	0	2	2	15	0	1	0	5	22
Grand Rapids	0	------	0	3	5	23	0	0	0	5	49
Wisconsin:											
Kenosha	0	------	0	0	0	2	0	0	0	0	7
Milwaukee	0	------	0	20	1	11	0	2	0	18	76
Racine	1	------	0	0	0	9	0	1	0	2	13
Superior	0	------	0	2	0	0	0	0	0	0	5

[1] Figures for Cincinnati, St. Joseph, Topeka, and Wheeling (deaths), estimated; reports not received.

City reports for week ended Nov. 6, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Minnesota:											
Duluth	0	------	0	0	2	1	0	0	0	15	13
Minneapolis	0	------	1	1	5	19	0	1	0	15	90
St. Paul	2	------	0	0	4	2	0	2	0	3	51
Iowa:											
Davenport	1	------	0	0	0	2	0	0	0	0	------
Des Moines	0	------	0	1	0	10	0	0	0	0	31
Sioux City	0	------	------	1	------	4	0	------	0	4	------
Waterloo	0	------	------	0	------	6	0	------	0	0	------
Missouri:											
Kansas City	1	1	0	1	7	19	0	4	0	3	92
St. Joseph	------	------	------	------	------	------	------	------	------	------	------
St. Louis	19	------	0	280	9	41	1	5	1	6	117
North Dakota:											
Fargo	0	------	0	0	2	4	0	0	0	6	16
Grand Forks	2	------	------	0	------	5	0	------	1	0	------
Minot	0	------	0	0	0	2	0	0	0	7	3
South Dakota:											
Aberdeen	3	------	------	0	------	0	0	------	0	0	------
Sioux Falls	0	------	0	0	0	0	0	0	0	0	8
Nebraska:											
Omaha	0	------	0	0	5	3	0	1	0	0	56
Kansas:											
Lawrence	0	1	0	1	0	1	0	0	0	1	4
Topeka	------	------	------	------	------	------	------	------	------	------	------
Wichita	2	------	0	0	4	3	0	1	0	10	23
Delaware:											
Wilmington	0	------	0	0	3	6	0	1	0	2	35
Maryland:											
Baltimore	3	------	0	1	20	22	0	10	5	51	181
Cumberland	0	------	0	0	2	0	0	0	0	0	10
Frederick	0	------	0	0	0	0	0	0	0	0	2
Dist. of Col.:											
Washington	5	------	0	3	13	9	0	12	1	3	156
Virginia:											
Lynchburg	8	------	0	0	1	0	0	0	0	3	6
Norfolk	0	------	0	0	3	3	0	0	0	0	18
Richmond	1	------	0	0	3	2	0	0	0	0	44
Roanoke	4	------	0	1	0	2		0	0	3	19
West Virginia:											
Charleston	1	1	0	0	5	1	0	2	0	0	56
Huntington	3	------	------	4	------	0	0	------	0	0	------
Wheeling	0	------	------	0	------	5	0	------	0	12	------
North Carolina:											
Gastonia	0	------	------	0	------	0	0	------	0	1	------
Raleigh	0	------	0	1	1	2	0	0	0	22	9
Wilmington	0	------	0	0	1	0	0	0	0	5	8
Winston-Salem	2	1	0	1	1	2	0	1	0	2	18
South Carolina:											
Charleston	1	12	1	0	1	1	0	0	0	0	14
Florence	0	------	0	0	1	3	0	1	0	0	11
Greenville	1	------	0	0	1	0	0	0	0	0	7
Georgia:											
Atlanta	2	17	2	18	10	14	0	5	0	9	92
Brunswick	0	------	0	0	0	1	0	0	0	0	4
Savannah	5	16	1	0	2	2	0	1	0	2	36
Florida:											
Miami	1	3	1	18	3	0	0	1	0	3	25
Tampa	0	2	2	0	0	0	0	0	0	0	16
Kentucky:											
Ashland	0	------	0	0	2	0	0	0	0	0	23
Covington	0	------	0	0	1	0	0	1	0	0	15
Louisville	4	2	0	0	4	18	0	5	0	14	56
Tennessee:											
Knoxville	2	------	0	2	3	3	0	1	0	0	32
Memphis	2	2	0	3	4	0	3	7	0	16	87
Nashville	0	------	0	0	7	1	0	1	0	0	48
Alabama:											
Birmingham	1	2	0	3	7	1	0	5	0	0	81
Mobile	1	------	1	0	3	2	0	1	0	0	22
Montgomery	2	------	------	0	------	1	0	------	0	3	------
Arkansas:											
Fort Smith	0	------	------	0	------	6	0	------	0	2	------
Little Rock	1	------	0	0	1	1	0	2	0	0	4
Louisiana:											
Lake Charles	0	------	0	0	0	0	0	0	0	0	6
New Orleans	6	1	2	0	6	5	0	14	0	10	140
Shreveport	0	------	0	0	5	3	0	0	1	0	26

City reports for week ended Nov. 6, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Oklahoma:											
Oklahoma City	1	------	0	0	5	4	0	1	0	0	43
Tulsa	0	------	------	0	------	10	0	------	0	17	------
Texas:											
Dallas	6	1	1	0	4	11	0	2	0	3	68
Fort Worth	2	------	0	0	1	9	0	0	1	2	19
Galveston	0	------	0	0	1	2	0	0	0	0	11
Houston	4	------	0	0	6	3	0	4	0	0	86
San Antonio	1	------	1	0	3	0	0	8	0	0	56
Montana:											
Billings	0	------	0	2	0	0	0	0	0	0	7
Great Falls	0	------	0	0	0	1	12	0	0	4	6
Helena	0	------	0	0	0	1	0	0	0	5	6
Missoula	0	------	0	0	3	0	0	0	0	0	8
Idaho:											
Boise	0	------	0	0	2	0	0	0	0	0	4
Colorado:											
Colorado Springs	0	------	0	0	0	2	0	0	0	0	10
Denver	2	------	1	12	5	15	0	6	2	10	76
Pueblo	0	------	0	0	0	3	0	1	0	0	9
New Mexico:											
Albuquerque	2	------	0	9	1	4	0	1	0	1	15
Utah:											
Salt Lake City	0	------	0	2	0	13	0	1	0	4	31
Washington:											
Seattle	0	------	1	0	5	2	0	1	0	12	72
Spokane	0	------	0	0	3	2	0	0	0	3	33
Tacoma	0	------	0	0	0	2	0	1	0	4	20
Oregon:											
Portland	4	------	0	3	3	3	0	1	0	1	87
Salem	0	------	------	0	------	1	0	------	0	0	------
California:											
Los Angeles	5	8	1	1	8	28	0	14	0	35	226
Sacramento	1	------	0	1	2	2	0	0	0	15	21
San Francisco	1	2	1	1	5	6	0	7	0	34	157

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Maine:			
Portland	0	0	1
Massachusetts:			
Boston	1	0	0
Springfield	1	0	0
Connecticut:			
New Haven	0	0	1
New York:			
New York	5	2	4
Pennsylvania:			
Philadelphia	2	1	0
Pittsburgh	1	0	0
Ohio:			
Cleveland	2	0	0
Indiana:			
Indianapolis	1	1	0
Illinois:			
Chicago	0	0	8
Michigan:			
Detroit	0	0	1
Wisconsin:			
Milwaukee	0	0	1
Racine	0	0	1
Minnesota:			
Minneapolis	0	0	2
St. Paul	0	0	1
Iowa:			
Des Moines	0	0	1
Missouri:			
St. Louis	0	0	1
Maryland:			
Baltimore	1	1	0
District of Columbia:			
Washington	1	0	0
West Virginia:			
Wheeling	1	0	0
Kentucky:			
Ashland	0	1	0
Tennessee:			
Knoxville	0	1	0
Memphis	0	0	2
Alabama:			
Birmingham	1	1	0
Louisiana:			
New Orleans	0	0	2
Texas:			
Houston	0	0	1
Colorado:			
Denver	0	0	1
Pueblo	0	0	1
Washington:			
Spokane	1	1	0
California:			
Los Angeles	0	0	5
Sacramento	0	0	1
San Francisco	1	0	0

Dengue.—Cases: Savannah, 1.

Encephalitis, epidemic or lethargic.—Cases: New York, 1, Baltimore, 1; Birmingham, 1.

Pellagra.—Cases: Wheeling, 2, Charleston, S. C., 5; Atlanta, 3; Brunswick, 1; Memphis, 1; Mobile, 2, Montgomery, 2; New Orleans, 1.

Typhus fever.—Cases: Norfolk, 1; Charleston, S. C., 3; Savannah, 2.

FOREIGN AND INSULAR

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths, P, present]

Place		Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	May 30–June 26, 1937	June 27–July 31, 1937	Week ended— August 1937 7	August 1937 14	August 1937 21	August 1937 28	September 1937 4	September 1937 11	September 1937 18	September 1937 25	October 1937 2	October 1937 9	October 1937 16	October 1937 23	October 1937 30
China:																		
Canton	C				62	32	48											
Hoihow	C				100													
Hong Kong	C				7	21	136	433	374	203	205	106	66	24	29	13	14	4
	D				7	19	82	177	219	126	116	66	36	26	16	4	13	4
Kwangchow Wan	C					7	45	52						20	13	23	6	
	D						34	47						20			6	
Macao	C						35	108	143	64	72	38	16	9	12	6		
Manchuria:																		
Dairen	C													3	1			
Kwantung Leased Territory	C												3					
Shanghai	C								8	29	394	726	655	513	333	359	110	90
Swatow	C							4	4	8	10	6			13	9		
Tientsin	C													1	7			
Chosen	C												[1] 1					
Dutch East Indies—Celebes	C												6					
Federated Malay States	D				2													
India	C	17,023	14,149	11,113	13,893	4,119	5,003	4,137	5,000	4,316	2,754	2,834						
	D	8,324	7,366	5,454	6,495	1,891	2,123	1,774	2,188	1,939	1,257	1,422						
Assam	C	1,823	2,554	435	63		8	3	24	18	10	11	5	13	6	3	12	25
	D	728	1,205	274	34		6	2	15	6	5	1	4	3	4	5	6	7
Bassein	C	86	97	6	1													
Bombay Presidency	C	557	3,259	1,713	2,936	1,281	1,573	1,419		1,143	890	762	571	391	430			
	D	237	1,457	674	1,098	580	579	560		467	374	448	282	202	212			
Bombay	C	[1] 1	[1] 2		[1] 1					[1] 1								
Calcutta	C	247	732	173	92	22	18	19	18	14	10	13	19	16	23	13	21	10

Central Provinces and Berar	C	5	83	318	62	32	45	44	55	85	90	59	52	154	214	177	211	104
Chittagong	C	13	143	34	5													
Madras Presidency	C	3,270	1,839	1,048	2,794	869	1,139	1,139	1,063	666	475	393	310					
	D	1,855	1,103	544	1,182	369	464	427	399	276	208	157	130					
Madras	C	5	1	6	16	17	7	16	24	20	25	25		17	15	35	23	16
	D	1		3	6	4	5	9	8	5	6	7		7	4	14	13	5
Negapatam	C		2	20				1			1	2				1		
	D			12	1							1						
Northwest Frontier Province	C						100	92	11			31	1	2	17			
Orissa Province	C	368	181	188	295	42	71	67	67	60			51	16	40	23	55	
Punjab	C	2	3	16	24	17	19	43	38	16	6	1	6					
Rangoon	C	6	12	7														
Sind State	C		1				1			1								
Tuticorin	C		2	10														
India (French):																		
Chandernagor Territory	C	5	8	2	2										2			2
Karikal Province	C										1							
Pondichery Province	C		1															
Indochina (French): [3]																		
Annam—Nghiloc	C															4	1	32
Haiphong	C												56	120	204	169	68	16
	D												30	75			82	
Hanoi	C													5	35	71	86	87
Tonkin Province	C												320	683	1,029	973	759	735
Japan:																		
Hiroshima	C												32					
Kobe	C													1				
Okayama Prefecture	C														1			
Taku	C											1			3			
Tokuyama	C														10			
Tokyo	C														1			
Philippine Islands: **Manila**	C	1																
	D	1																
Siam:																		
Bangkok	C	948	338	28	5	1												
Provinces	C	1,646	796	255	151	12	16	10	4	8	5		3	2	2	2	1	
Straits Settlements: **Penang**	C			1														

On vessels:

S. S. *Kedah* at Singapore from Penang	1 case	Apr. 6, 1937
S. S. *Kedah* at Belawan-Deli	1 case	Apr. 10, 1937
S. S. *Hellas* at Bangkok from Swatow	3 cases	Apr 16 1937
S. S. *Ellenga* at Penang from Negapatam	15 cases	June 2, 1937
S. S. *Aronda* at Rangoon from Calcutta	1 case	June 3, 1937
S. S *Badahur* at Rangoon from Calcutta	1 case	June 11, 1937
S S. *Talamba* at Port Swettenham from Madras	2 cases	June 27, 1937
S. S. *Chungking* at Bangkok from Hoihow	1 case	July 15, 1937
S. S *Kwantung* at Hong Kong from Hoihow	1 case	July 21, 1937
S. S. *Kiangsu* [4] at Singapore from Hong Kong	1 case	July 22, 1937
S. S. *Eagle* at Hong Kong from Kongmoon	1 case	July 27, 1937

On vessels—Continued

S S. *Muinam* at Singapore from Hong Kong	2 cases	Aug. 16, 1937
S. S *Sandriken* at Hong Kong	Present	Aug 18, 1937
S S *Haiching* at Hong Kong	Present	Do.
S S *Talma* at Singapore from Hong Kong	1 case	Aug. 20, 1937
S S *Cremer* at Singapore from Amoy, Hong Kong, and Swatow	1 case	Aug. 24, 1937
S S. *Tyndareus* at Kobe from Hong Kong and Dairen	1 case	Aug. 27, 1937
S. S *Manila Maru* at Moji from Hong Kong	1 case	Aug 31, 1937
S. S. *Anking* at Singapore from Hong Kong	1 case	Sept. 10, 1937
S S *Sphinx* at Singapore from Hong Kong	1 case	Sept. 15, 1937
S S *Kiungchow* at Hong Kong from Shanghai	3 cases	Oct. 3, 1937

[1] El Tor strain.
[2] Imported.
[3] For reports prior to Mar. 28, 1937, see previous issues of PUBLIC HEALTH REPORTS.
[4] In addition for week ended July 28, 3 cases with 2 deaths in contacts.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE[1]

[C indicates cases; D, deaths; P, present]

Place		Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	May 30–June 26, 1937	June 27–July 31, 1937	Week ended— August 1937 7	14	21	28	September 1937 4	11	18	25	October 1937 2	9	16	23	30
Algeria: Algiers	C				[3] 1													
Argentina. (See table below.)																		
Belgian Congo	C																	[3] 2
Bolivia. (See table below.)																		
British East Africa:																		
Kenya	C	5	7	24	42	4	5		7	4	3	3	1	10	1	1		
Tanganyika	C	29	11	6		1												
Uganda	C	24	48	39	47	4	10	8	10	6	5	26	13	12	9	12		
	D	22	43	38	43	4	10	8	10	6	5	26	11	12		12		
Ceylon:																		
Central Province—Nuwara Eliya District	C			1														
Chilaw District	C		1															
Colombo	C		2	2					1									1
	D		2	2					1									1
Plague-infected rats		2	1	3	1							2			1	1	1	
China:[4]																		
Amoy	C	2																
Fukien Province[4]	D	130																
Hsiatangchi.[4]																		
Manchuria.[4]																		
Dahomey. (See table below.)																		
Dutch East Indies:																		
Java and Madura	C	259	230	205	226	54	60											
	D	255	255	205	224	54	60											
Java—Batavia	C	1																
Pasoeroean	C				1													
Ecuador (see also table below):																		
Guayaquil	C	17	8	4				1						1		1		
	D	16	3	3	1			1						1			1	
Plague-infected rats		37	27	13	2		2			1						2		
Egypt:																		
Asyut Province	C	48	9	1														
Dakahliya Province	C	1																
Girga Province	C	1	3	1														1

Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua District:																		
Hamakua Mill Sector [5]							5	2	1	3			1		1			2
Honokaa Sector					3													
Paauhau Sector		4	4	7	1				1	1								1
Maui Island—Makawao District—Omaopio [5]										1								
India	C	6,094	2,502	316	558	212	232	187	331	370	356	483						
	D	3,467	1,690	203	356	116	121	119	166	192	172	200						
Bassein	C	8	7	6	1		2											
Plague-infected rats		2	2	2	1													
Bombay Presidency	C	68	35	24	33	8	7	17	11	21	8	22	11	17	18			
	D	37	16	9	20	9	4	7	5	11	9	12	10	13	10			
Central Provinces and Berar	C	1,103	363	7	10	2	8	33	42	35	50	59	141	31	121	96	48	286
Cochin	C											2						
Karachi	C	5	1							4	4	4						
Plague-infected rats		1																
Madras Presidency	C	53	23	6	106	46	41	65	51	24	33	41						
	D	30	12	3	63	24	24	25	25	14	20	17						
Punjab	C	1	2				17											
Rangoon	C	3	2		[6] 2		2	3										
Sind State	C	6	2							4	4							
Indochina (French) (see also table below):																		
Pnom-Penh	C			1														
Sadec	C				1						1							
Madagascar. (See table below.)																		
Malta	C	1	4															
Peru. (See table below.)																		
Senegal:																		
Dakar	C	1		1	1							1						
Thies	C		2	4														
Tivaouane	C		1		1													
Syria: Ras el Ain region	D			[7] 12														
Tunisia: Tunis	C		1		2													
Plague-infected rats		17	5		1													
Union of South Africa (see also table below)	C	[8] 1									[8] 1						[8] 1	

[1] Including plague in the United States and its possessions.
[2] Suspected.
[3] Includes 1 case of pneumonic plague.
[4] Plague has been reported in China as follows: Information dated Aug. 18 reports an outbreak in West Hsingan (Khingan) and Southern Lungkiang Provinces. Under date of June 1, estimated deaths from plague in Fukien Province reported to be 3,000 to 4,000. According to a report dated May 10 several hundred deaths from bubonic plague occurred in Hsiatangchi. Information dated Sept. 2 states that 115 cases and 105 deaths occurred in Manchuria, China.
[5] Plague has also been reported in Hawaii Territory as follows: Week ended Aug. 14, 1 lot of 5 rats and 1 lot of 3 mice, by mass inoculation in Hamakua Mill Sector, Hamakua District, Island of Hawaii; week ended Nov. 20, 10 rats by mass inoculation in Omaopio, Makawao District, Island of Maui.
[6] Imported.
[7] Pneumonic plague.
[8] For 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases; D, deaths; P, present]

Place	Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	May 30–June 26, 1937	June 27–July 31, 1937	Week ended— August 1937 7	August 1937 14	August 1937 21	August 1937 28	September 1937 4	September 1937 11	September 1937 18	September 1937 25	October 1937 2	October 1937 9	October 1937 16	October 1937 23	October 1937 30
United States: [9]																	
California: [9 10 11]																	
Eldorado County — Plague-infected fleas.																	
Fresno County [10] C									1								
Plague-infected fleas.																	
Plague-infected ground squirrels												3					
Placer County [11]—Plague-infected fleas.																	
San Bernardino County—Plague-infected fleas.																	
San Mateo County—Plague-infected fleas, lice, and ticks.																	
Idaho: [9] Bannock County—Plague-infected ground squirrels			(12)														
Montana:																	
Beaverhead County—Plague-infected ground squirrel				1													
Madison County — Plague - infected squirrels							1	1									
Nevada: [9]																	
Douglas County C			1														
Ormsby County — Plague - infected fleas and lice.																	
Oregon: [9]																	
Grant County — Plague - infected ground squirrel		1															
Lake County—Plague-infected fleas.																	
Wallowa County — Plague - infected ground squirrels		1	1														

Utah: [9]																	
Morgan County — Plague - infected fleas.																	
Wasatch County — Plague - infected ground squirrels							1										
Washington: [9] Adams County—Plague-infected fleas and lice.																	

Place		April 1937	May 1937	June 1937	July 1937	August 1937	September 1937
Argentina:							
Cordoba Province	C						1
Mendoza Province	C				[13] 9		
Salta Province	C					[13] 1	
Santiago del Estero Province	C				[13] 6		
Bolivia:							
Chuquisaca Department	C	[13] 2					
La Paz Department	C		[13] 2	[13] 2			
Oruro Department	C	[13] 1					
Potosi Department	C	[13] 1					
Dahomey	C			1			
Ecuador (see also table above):							
Manabi:							
Bahia	C	2					
Manta	C	13					

Place		April 1937	May 1937	June 1937	July 1937	August 1937	September 1937
Indochina (French) (see also table above)							
Cambodia	C	4	4	4	2		
Cochinchina	C				2		1
Madagascar (central region)	C	57	45	23	25	22	
	D	57	43	22	24	22	
Peru	C	9	12	4	7	3	5
Huancabamba Department	C	3					
Lambayeque Department	C	1	1	1	1	2	2
Libertad Department	C	4	3	2	4	1	
Salaverry	C				3		
Lima Department	C	1	2	1	2		3
Piura Department	C		6				
Union of South Africa (see also table above)	C	1					

[9] Plague infection proved in insect hosts as follows *California*—Eldorado County, Aug. 31; Fresno County. Oct. 7-Nov. 5; Placer County, June 22; San Bernardino County, July 12-Sept. 8; San Mateo County, July-Aug. 27 *Idaho*—Bannock County, July 8. *Nevada*—Douglas County, July 29-31; Ormsby County, July 2-Aug. 20. *Oregon*—Lake County, May 7; Wallowa County, June 25. *Utah*—Morgan County, reported Aug. 10. *Washington*—Adams County, Apr 29, 1937.

[10] For 3 weeks ended Oct. 23, plague infection proved in pooled tissue from squirrels, chipmunks, and mice in Fresno County.

[11] For week ended Oct. 9, plague infection proved in pooled tissue from squirrels, chipmunks, and rats, and week ended Oct. 30, pooled tissue from squirrels, in Placer County.

[12] Number unspecified.

[13] Pneumonic plague

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	May 30–June 26, 1937	June 27–July 31, 1937	Week ended— August 1937 7	14	21	28	September 1937 4	11	18	25	October 1937 2	9	16	23	30
Algeria:																		
Algiers Department	C		1	2											1			
Oran Department	C		3	1														
Southern Territories	C	2																
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		
Brazil:																		
Bahia (alastrim)	C	15	10	2	16	4	4	2		1	4	1		3				
Porto Alegre (alastrim)	D	3	1	1	2	2												
Recife (alastrim)	C	1									1							
British East Africa:																		
Kenya	C		1		116													
Tanganyika	C	72	93	57	65	131		52	3	76		44	1					
Canada:																		
Alberta	C	[1] 1		[1] 1	5													
Saskatchewan	C								[1] 1									
China:																		
Amoy	C	2	1	1														
Canton	C	4	2															
Dairen	C	8	2	5	2	1			1									
Foochow	C	P	P	P	P		P		P		P		P		P			
Hangchow	C	3	1		1													
Hankow	C	11	11	4					1									
Hong Kong	C	32	16	7	9	3	2	76	1					1				
Nanking	C	3	1	4														
Shanghai	C	55	54	18	29	1		1		1								
Swatow	C	4	5	2														
Tientsin	C	3	7	4														
Chosen. (See table below.)																		
Colombia (see also table below): Barranquilla	D	1		2	1									1				
Dahomey. (See table below.)																		
Ecuador: Guayaquil	C	24	31	48	37	6	2	7	5		1	2		1		3	5	4

Egypt: Port Said	C	4		1	1													
Eritrea	C	4	1	3	2								28					
Estonia	C	2																
France. (See table below.)																		
Greece: Salonika	C	30	37	5	24													
Guatemala. (See table below.)																		
Honduras: Puerto Castilla	C	1																
India	C	12,022	10,906	9,247	6,578	962	824	576	664	455	348	427						
	D	2,557	2,689	2,725	1,875	313	256	172	169	109	94	137						
Assam	C	204	384	238	107	21	33	16	28	14	19	12	13	18	7	9	6	5
Bombay Presidency	C	1,147	1,178	536	331	39	56	39	43	50	40	29	62	23	51			
	D	198	228	120	106	17	13	8	15	14	4	10	10	5	12			
Bombay	C	136	165	105	104		7	8	13	4	10	20	13	11	17	3	4	6
	D	68	105	72	69		7	3	8	4	3	7	9	3	10	3	4	3
Calcutta	C	57	106	21	14	22	2	6	10	10	4	7	7	3	3	4	4	6
	D	51	47	19	10	2	3	3	8	6	2	5	4	2		3	4	5
Central Provinces and Berar	C	505	452	202	153	33	5	17	6	5	13	3	23	10	5	2	4	5
Chittagong	C	12	1	[2] 2	2													
Cochin	C	47	3															
Delhi	C				12	4	2		1							1		
Karachi	C	28	19	5	2					[2] 2								
Madras Presidency	C	569	483	130	462	100	118	100	97	113	58	65	82					
	D	89	98	31	104	29	25	16	25	13	14	19	16					
Madras	C	24	49	43	95		26	38	38	27	14	21	14	19	5	18	19	13
Moulmein	C	8		[2] 1														
Northwest Frontier Province	C	49	30	46	171	12	25	36	3	8	2	17		1	35	17	87	14
Orissa Province	C	766	618	457	462	93	63	92	62	52			65	30	62	27	36	
Punjab	C	400	513	674	560	57	40	17	51	21		17	31	8	7		91	
Rangoon	C	9	3	1			[2] 1											
Sind State	C	263	188	254	279	86	43	24	56	30	17	17	32	31	10	17	8	12
Indochina (French) (see also table below):																		
Pnom-Penh	C	1	1	1														
Saigon-Cholon	C				1													
Tourane	C	3																
Iran	C	2		2					3									
Teheran	C		1				1											
Iraq	C	14	2		2	4			1									
Baghdad	C		1															
Italian Somaliland	C				1													
Japan:																		
Moji	C	10	3															
Osaka	C	1		[3] 1														
Yokohama	C	1																

[1] For 2 weeks.
[2] Imported.
[3] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	May 30–June 26, 1937	June 27–July 31, 1937	Week ended— August 1937				September 1937				October 1937				
						7	14	21	28	4	11	18	25	2	9	16	23	30
Mexico (see also table below):																		
Chihuahua	C				1						1							
Ciudad Juarez	D				1													
Durango	D	8	5	4	1									1				
Guadalajara	D	1	2	1														
Mazatlan	C			1	1													
Mexico, D. F.	C	10	36		10	2		2	4	1	1		4	1				
Monterrey	C	3	1		1		1					2						
San Luis Potosi	D		1											1				
Torreon	C	11	22	12	7		1	1	1			1						
	D				11	2	3	1	1		1	1	1	1	1		1	2
Morocco. (See table below.)																		
Nigeria	C	188	281	111	229				[2] 71									
Lagos	C	1																
Nyasaland. (See table below.)																		
Panama Canal Zone: Colon	C													2				
Portugal (see also table below):																		
Lisbon	C	1	1	6	6				1	1	1	3		2		1		
Oporto	C			1	1					1	1							
Salvador. (See table below.)																		
Senegal. (See table below.)																		
Siam: Tak Province	C	7		3	3		1											
Sierra Leone	C		2	1			[2] 5											
Southern Rhodesia	C	1																
Sudan (Anglo-Egyptian)	C	2	13	39	8	2		3	1	2	2	13	10	8	7	8	20	21
Tunisia	C			4														
Turkey. (See table below.)																		
Unfederated Malay States: Kedah	C				P													
Uruguay	C			3														

[2] For 4 weeks.

On vessels:

S. S. *Daviken* at Hong Kong	1 case	Mar. 31, 1937
S. S. *Talma* at Hong Kong	1 case	Apr. 1, 1937
S. S. *Jalagopal* at Rangoon from Chittagong	1 case	Apr. 2, 1937
S. S. *Taksang* at Hong Kong	1 case	Apr. 13, 1937
S. S. *President Hoover* at Yokohama from Honolulu	1 case	Apr. 17, 1937
S. S. *Hydri* at Karachi	1 case	Apr. 24, 1937

On vessels—Continued

S. S. *G. G. Pasquier* at Singapore from Saigon	1 case	May 7, 1937
S. S. *Changte* at Thursday Island	1 case	June 26, 1937
S. S. *Empress of Japan* at Kobe from Manila	1 case	Aug. 11, 1937
S. S. *Northern Prince* at New York from Rio de Janeiro	1 case	Aug. 19, 1937
S. S. *Empress of Asia* at Honolulu	1 case	Sept. 5, 1937
S. S. *Castalia* at Suez from Karachi and Bombay	1 case	Oct. 5, 1937

Place		April 1937	May 1937	June 1937	July 1937	August 1937	September 1937
Belgian Congo	C	143	287		366	312	
Bolivia	C	25	48				
La Paz	C						30
China: Manchuria—Harbin	C	11	4		1		
Chosen	C	73	27	1			
Colombia (see also table above)	C	89	51	108		[4] 209	
Dahomey	C	2					
France	C	1	1				
Guatemala	C			2		1	
Indochina (French) (see also table above)	C	316	274	273	143	226	96
	D	46	95	50	30	63	12
Mexico (see also table above):							
Aguascalientes State—Aguascalientes	C	1	1				
Chihuahua State	C	1	2				
Colima State	C	4					
Jalisco State—Guadalajara	C	1		1			
Mexico—Continued.							
Mexico State	C		1				
Mexico, D. F	C	13	41	28	18		
Mexico City	D				3	1	2
Nuevo Leon State—Monterrey	C				1		
Queretaro State	C	1	10	8			
San Luis Potosi State—San Luis Potosi	C	1		1			
Yucatan State	C				1		
Morocco	C	6	1	1	4		1
Nyasaland	C	3					
Portugal (see also table above)	C	15	29				
	D	5	1				
Salvador	C	4					
Senegal	C	29	28	36	16		
Turkey	C	15	4	1			

[4] Includes July and August.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER

[C indicates cases; D, deaths; P, present]

Place		Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	May 30–June 26, 1937	Week ended— July 1937					August 1937				September 1937				October 1937		
					3	10	17	24	31	7	14	21	28	4	11	18	25	2	9	16
Algeria:																				
Algiers Department	C	96	78	79	15	8	34		[1] 140	4	6	13	7	6	1				20	2
Algiers	C	4	4	2	1	5	5		[1] 62	2		1								
Constantine Department	C	348	417	216	65	46	23		[1] 69	16	52	9	6	13	3		10	2	9	2
Bone	C	4	6	11			3		[1] 12	4										
Constantine	C						3		[1] 19	7							2			
Philippeville	C		1						[1] 1											
Oran Department	C	24	10	26	4		6		[1] 6	6		1		4						
Southern Territories	C	1	2	9	3	1							1							
Australia: Sydney	C		1																	
Bolivia. (See table below.)																				
Bulgaria	C																	12		
Chile	C	154	253	272	34	61	56	72	50											
Concepcion Province	C	14	3	1	3	12	1	12	4	7	3	3	3							
Iquique	C		1	2																
Linares Province	C					4	1	1	3	3	2	1								
Malleco Province	C				4			1		2	1	3	2							
Nuble Province	C				1	2		4			2	1								
Santiago Province	C	58	113	111	17	23	35	34	28	40	41	25	45							
Valparaiso	C	39	71	105	17	6	13		14	14	8	15	10	6	2	4	2	5	4	5
China (see also table below):																				
Hankow	C			1				1			1									
Nanking	C		4																	
Shanghai	C		4	4	5									2						
Swatow	C				1	2														
Tientsin	C	1	2	6		1							1		1	2				
Tsingtao	C	1	12		1															
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				
Egypt:																				
Alexandria	C	5	20	5		1	1		4	4	5	3	1	1	1	1	1		2	2
Aswan Province	C	5	6																	
Asyut Province	C			5	1	1	2		2	2										
Beheira Province	C	53	74	14	10	7	5		1	1										

Beni-Suef Province	C		1																	
Cairo	C	14	17	1												1				
Dakahliya Province	C	38	74	15	14	10	6		1	3										
Damietta Province	C			2																
Faiyum Province	C						1													
Gharbiya Province	C	59	135	55	17	19	1		4											
Girga Province	C		1	2	1	1														
Giza Province	C						2													
Minufiya Province	C	11	25	4		1			3											
Minya Province	C		2							1										
Port Said	C			1	1	1														
Qena Province	C	14	33	3																
Sharkiya Province	C	2	11	3		1														
Suez	C			1				1	1					1	1					
Provinces	C	243	709	307	45	40	17	15	13	14	6	6	11	9			1	1	1	1
Eritrea: Asmara	C	6	4	2			1													
Finland. (See table below.)																				
Greece. (See table below.)																				
Guatemala. (See table below.)																				
Hawaii Territory: Honolulu	C	1			1		1	2					1			2		2		2
Hungary	C		1		1															
Iran	C	7	14	25												1				
Teheran	C		1	1																
Iraq:																				
Baghdad	C	[2] 5		1	1		1													
Diwaniyeh Province	C		6																	
Kirkuk Province	C	8	3	12	2															
Kut Province	C	1																		
Irish Free State. Kerry County—Cahercriveen	C	4																		
Latvia. (See table below.)																				
Libya. (See table below.)																				
Lithuania. (See table below.)																				
Mexico (see also table below):																				
Mexico, D. F.	C	13	18					2		5	6	5	11	4	11	6	1	3		
San Luis Potosi	D			1																
Torreon	C	1																		
Morocco (see also table below)	C	120	352	174	31	15	13	19	7	7	3	9	2	6	7	3		1	17	11
Casablanca	C			200	2				3	3	2								4	
Palestine.																				
Haifa	C	1	6	1		2		1		1		2	1	4	3	4		3		7
Jaffa	C	4	6	3	1		2			1	4	1	3	4	5			1		6
Panama Canal Zone. (See table below.)																				
Poland	C	629	805	287	30	18	18	13	10	13	19	6	5	5	6	8	7	9	9	
	D	40	43	20			1			3	1									
Rumania. (See table below.)																				
Sierra Leone: Freetown	C		2																	
Straits Settlements: Singapore	C			1																
Switzerland	C					1													1	

[1] For 2 weeks.
[2] Imported.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	May 30–June 26, 1937	Week ended— July 1937: 3	10	17	24	31	August 1937: 7	14	21	28	September 1937: 4	11	18	25	October 1937: 2	9	16
Syria	C	1																		
Trans-Jordan	C	3	5			1														
Tunisia:																				
Tunis	C	4	20	19	1	1	1		1	2	6	1	1	5	1	1				2
Provinces	C	428	666	545	87	97	106		47	57	80	59	20	12	14		50	1	38	24
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				

Place		April 1937	May 1937	June 1937	July 1937	August 1937	September 1937
Bolivia	C	48	39	35			
China: Manchuria—Harbin	C	45	29	35	14	8	
Chosen	C	147	99	85			
Czechoslovakia	C	25	3				
Finland	C	1		1			
Greece	C	2	1	11	5	3	
Guatemala	C	13	12	8	16	10	6
Latvia	C	1					
Libya	C		13	34	10		
Lithuania	C	37	6	2	7		2
Mexico (see also table above):							
Aguascalientes State: Aguascalientes	C	1	2				
Guanajuato State	C		4		3		
Hidalgo State	C	5	1	2			
Mexico State	C		2		14		
Mexico (see also table above)—Con.							
Mexico, D. F	C	16	14	14	16		
Mexico City	D				5	3	4
Queretaro State	C	1	2	2			
San Luis Potosi State: San Luis Potosi	C	2	2				
Morocco (see also table above)	C	190	283	182	89	25	16
Panama Canal Zone	C		2				
Rumania	C	832	557	177	61	26	
Turkey	C	39	155	72	30	7	14
Istanbul	C	3		3	2	2	
Union of South Africa:							
Cape Province	C	41	35	12	50	81	
Natal	C		7	13		2	
Orange Free State	C	3	27	35	11	2	
Transvaal	C		1	3	13		

YELLOW FEVER

Place		Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	May 30–June 26, 1937	Week ended—																	
					July 1937					August 1937				September 1937				October 1937				
					3	10	17	24	31	7	14	21	28	4	11	18	25	2	9	16	23	30
Brazil:																						
Amazonas State	D											1										
Matto Grosso State [1]	C	4	2																			
	D		4		1																	
Minas Geraes State [1]	D	13	1																			
Para State [1]	D	1			2	1	1		2			1				1						
Piauhy State	D			1																		
São Paulo State [1]	D	16																				
Colombia:																						
Boyaca Department	C		1	1	2							1										
	D		3				2	2				1	1							1		
Caldas Department	D															1						
Cundinamarca Department	D			2			1			1	1				1	1						
Intendencia of Meta—Villavicencio	D	3															1					
Santander Department	C													2								
	D	2	2		1					2			2			4	2					
Dahomey: Bohicon	C			1																		
French Equatorial Africa:																						
Bangui	D															1						
Brazzaville	D	1																				
Fort Archambault	C															[2] 2						
Libreville	C								1													
	D								1													
Gold Coast [3]	C		4	11	5		10	2	6	6	2		1		3			1	1		1	1
	D		1	11	4		10	2	3	4					2			1				
Accra	C			2	1		1						1		[2] 1							
Nugo	C		1																			
Ivory Coast:																						
Agboville	C										1											
Gaoua	C														2							
	D														1	[2] 1						
Touba	D																[2] 1		[2] 1			
Nigeria:																						
Aba	C											1										
Abeokuta	C														1							
Forcados	C							1														
Ibadan	C								1													

[1] See also reports of yellow fever in Brazil on pp. 463, 536, 657, 683, 762, 818, 912, 1134, and 1248 of the PUBLIC HEALTH REPORTS.

[2] Suspected.

[3] During the week ended Nov. 6, 1937, 2 cases of yellow fever with 1 death were reported in Gold Coast.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

[YELLOW FEVER—Continued

[C indicates cases; D, deaths; P, present]

Place		Mar. 28–Apr. 24, 1937	Apr. 25–May 29, 1937	May 30–June 26, 1937	Week ended— July 1937 3	10	17	24	31	August 1937 7	14	21	28	September 1937 4	11	18	25	October 1937 2	9	16	23	30
Nigeria—Continued.																						
Jos	C																		2			
Maiduguri	C																					[3]1
Ogbomosho	C				3	1		1														
	D				1			1														
Ovim	C										3											
	D								1													
Sapele	C												1									
Shendam	C																1					
Paraguay [4]	C					P																
Peru: Perene region (Pampa Whaley)	C	[5]23																				
	D	8																				
Senegal: [6]																						
Bambey	C			[3]1																		
Dakar [6]	C		[3]1																[3]1			
Diakhao	C		1																	1		
Diourbel	C													1								
Gade.[6]	D											1										
Gossas	C												1				1		3			
Kaolakh [6]	C																					[3]1
Malem Hodar	C		1																			
Rufisque	C																	1		1		
Tampa-Counda	C											[3]1										
Thies	C																			2		2
Thies Circle—Khombole [6]	C	1																				
Tilmaka	C	1	1																			
Tivaouane	C	1																				
Sudan (French):																						
Mahina	C		[3]1																			
Toukoto.[7]																						

[3] Suspected.

[4] A dispatch dated June 4, 1937, from the United States legation in Asuncion, Paraguay, states that yellow fever has been officially reported in the northwestern part of Paraguay

[5] Jungle type.

[6] Yellow fever has also been reported in Senegal as follows: Week ended Nov. 6, 1937, 2 imported cases including 1 suspected case at Dakar; 1 suspected case with 1 death in Gade; 1 suspected case in Kaolakh; 1 case with 1 death in Khombole, Thies Circle.

[7] During the week ended Nov. 13, 1937, 1 suspected case with 1 death was reported in Toukoto, French Sudan.

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UNITED STATES TREASURY DEPARTMENT

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THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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THE INCREASE IN AVERAGE LENGTH OF LIFE *

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Since the dawn of recorded history, man has continually sought a means of increasing his length of life. Such records as are available for the past 150 years indicate that this effort was relatively unsuccessful until fairly recent times. During the past few generations, however, the application of the principles of sanitation, the rise in the general level of the standard of living, and, in certain instances, discoveries in prophylactic and therapeutic medicine have resulted in a rapid increase in the number of years an infant can expect to live. It is important to note that the increase in length of life has been in the average number of years lived and not in the "span of life", which usually refers to the maximum length of life attainable by the species. So far as it is known, there has been no increase in the span of life; persons living to advanced ages do not live a greater number of years now than formerly. The exact length of the span of life is unknown. It is somewhat more than 100 years, but how much more cannot be said. The census of 1930 reported 3,964 persons 100 or more years of age; but this is undoubtedly an overstatement, since 2,467 of them were Negroes, who make up only about 10 percent of the population.

The precise meaning of various life-table functions should be kept clearly in mind during the following discussion. Before constructing a life table from the returns of a population census and the registration of deaths, it is necessary to determine the mortality rate at each year of age. This rate is usually computed from the number of deaths actually registered in a given population. In order to avoid irregularities arising from unusual mortality conditions, such as an epidemic, prevailing in a single calendar year, the mortality rate is frequently based on the average of a period of years. The United States Bureau of the Census has recently prepared a set of life tables based on the deaths occurring in the 10-year period, 1920-29. In many instances a shorter period, such as 3 or 5 years, is chosen.

The set of mortality rates adopted is applied to a hypothetical number (usually 100,000) of newborn live babies thus computing the

* From Statistical Investigations, Division of Public Health Methods, of the National Institute of Health in cooperation with the Division of Sanitary Reports and Statistics, United States Public Health Service

number who would be alive at each age thereafter until all are dead. It is not necessary to assume that all of these infants are born at the same time so long as each is followed until death. The average number of years lived by this group of infants is called the expectation of life at birth. Similarly the average number of years lived thereafter by all who reach 20 years of age is called the expectation of life at age 20. In other words, the expectation of life is the average number of additional years of life which a person reaching any given age may expect to live.

The assumptions of a life table, of course, are unreal. At the present time, at least, mortality rates do not remain constant. The mortality rates to which persons aged 60–64 in 1930 were subjected when they were 0–4 years of age were considerably greater than the rates to which children aged 0–4 in 1930 were subjected. Furthermore, the expectation of life is not applicable to any population which exists in actual experience. The expectation of life at birth, for example, is the average number of years which a newborn live infant could expect to live if born into a hypothetical population called the stationary life-table population.

This stationary population represents the population which would eventually arise if the individuals represented by 100,000 living births occurring uniformly throughout each year were always subject to the assumed mortality rates. If instead of merely one generation of 100,000 living births we think of continuously repeated generations of exactly 100,000 living births, all subject to the same mortality rates at each age of life, a population known as a life-table population would eventually develop.

This population would always be composed of the same number of people, since the number of births is constant and the death rates never change. Consequently the number of births and deaths in any calendar year in such a population would be exactly equal. It is also obvious that it is a population which would arise in the absence of immigration or emigration. This is the kind of population to which the calculated expectation of life is applicable.

Such a population never occurs in everyday life. Actual populations are constantly changing due to changes in mortality and birth rates and to variations in immigration and emigration. However, in spite of this, the various life-table functions are a convenient, even if artificial, method of summarizing the mortality conditions of a particular group of people at a particular period of time.

For convenience, terms like "the expectation of life at birth in 1933 was 61 years" will be used in the following discussion. This will be a brief expression for the statement that in a population undisturbed by immigration or emigration and in which the number of deaths is constant and exactly equal to a given number of live births uniformly

distributed throughout the year and in which deaths always occur according to the mortality rates observed in 1933, the expectation of life at birth would be 61 years.

EXPECTATION OF LIFE PRIOR TO 1800

Information concerning the average length of life prior to the nineteenth century is scanty and inaccurate. The expectation of life at birth apparently was about 20 to 25 years in Rome during the early Christian era, although it may have been nearly twice that in northern Africa (*1*). Life tables constructed prior to 1800 for various European cities indicate that the expectation of life at birth was between 25 and 35 years (*2*) (*3*). These life tables were based upon deaths alone and consequently are only rough approximations at best. The first life table computed from deaths and the population of specific ages exposed to death was published by Milne in 1815, based on the mortality experience of two parishes in Carlisle, England, during the period 1779–87. According to this table the expectation of life at birth for both sexes combined was 38.7 years.

CHANGES IN LIFE EXPECTANCY IN MASSACHUSETTS SINCE 1790

Mortality rates 1868–1930.—Comprehensive mortality records were not available for the entire United States until 1933, when the registration area for deaths was completed by the admission of Texas. Fairly satisfactory data are available for 10 States as far back as 1900; but prior to the beginning of the present century, the only data of which a detailed analysis has been made are for Massachusetts. The changes in mortality rates by age and sex in Massachusetts from 1868–1930 are shown in figures 1A and 1B.

Perhaps the most striking feature of these curves is the rapid decline in mortality rates for the ages of childhood, adolescence, and early adult life and the absence of decline or even slight increase in mortality rates for the ages above 50 years. The decrease in the mortality rates of early life has been more rapid since 1900 than prior to that time. Mortality rates at most ages have declined more rapidly for females than for males. Prior to 1900 the death rates of females from 5 to 50 years of age were generally equal to or greater than the corresponding rates for males; but especially since 1920, relatively fewer females than males have died in each age group except 20–29, an exception due partly to the hazards of childbirth.

Expectation of life 1789–1930.—How have these changes in mortality affected the average number of years which a newborn child in Massachusetts may expect to live? The earliest life table for Massachusetts is one constructed by Edward Wigglesworth from bills of mortality for certain towns in Massachusetts and New Hampshire which were on

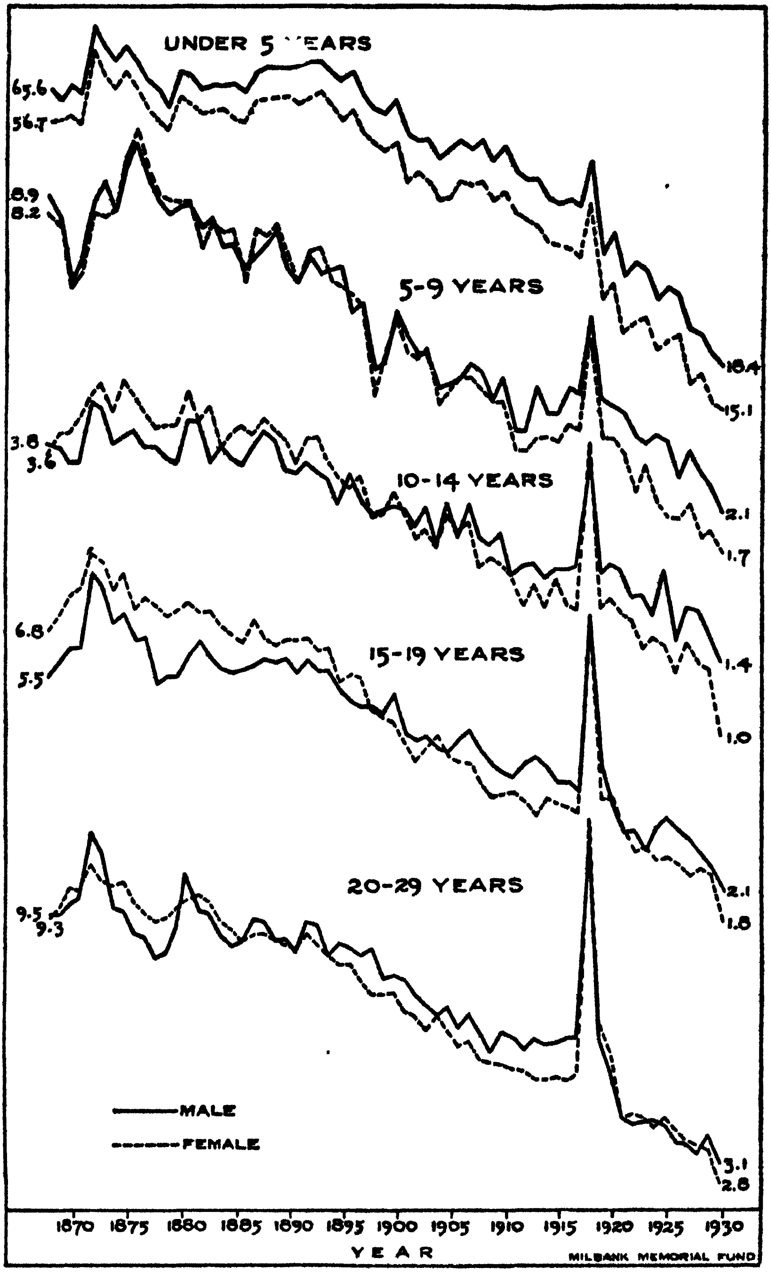

FIGURE 1A.—Trend in the death rate at specific ages, Massachusetts, 1868–1930. (Semi-logarithmic scale. The death rate is the number of deaths per 1,000 population of each sex and is printed on the chart for 1868 and 1930. Reproduced from Sydenstricker (*15*), by permission.)

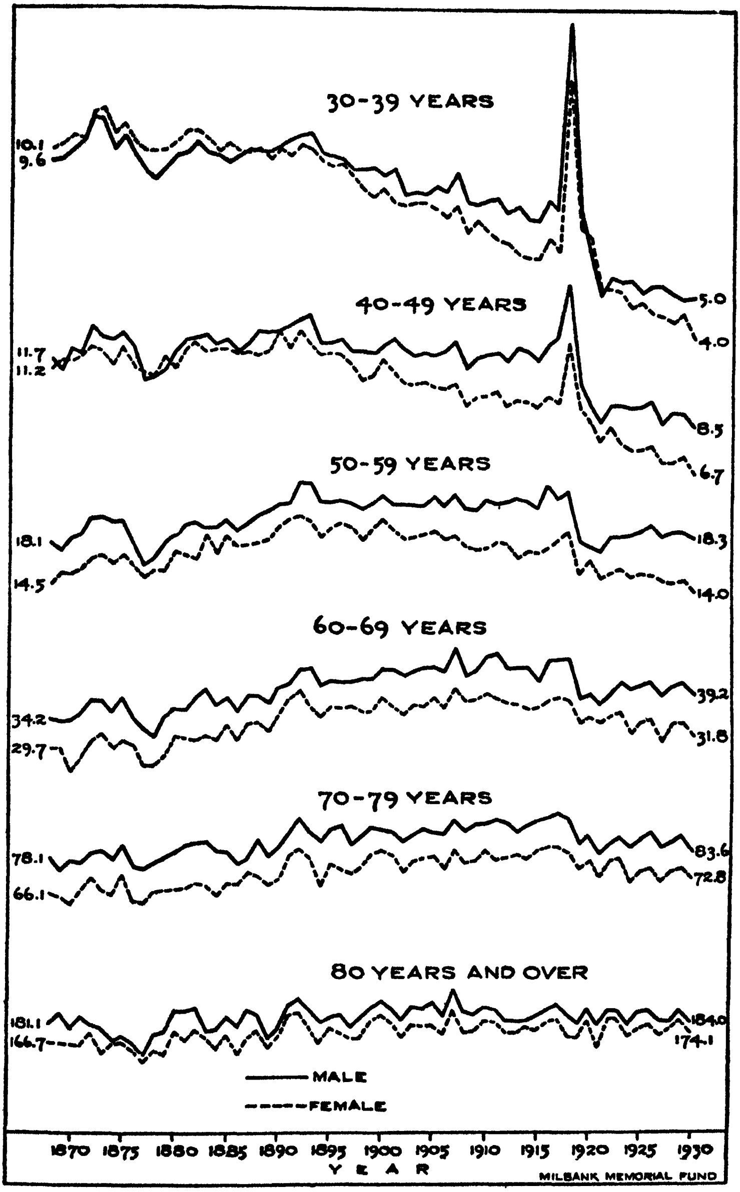

FIGURE 1B.—Trend in the death rate at specific ages (continued from fig. 1A)

file with the American Academy of Arts and Sciences (*4*). These bills were for a number of years prior to 1790. Since this table was constructed from deaths alone, its results should be regarded only as rough approximations. E. B. Elliott apparently constructed the first life table for Massachusetts according to modern principles on the basis of deaths registered in 1855 in 166 of the 331 towns in the State (*5*). Since the death rate was greater than 16 per 1,000 population, death registration was considered reasonably complete. These towns included about two-thirds of the entire population of the State. A number of other tables were computed prior to 1880, but most of them are of historical value only. Following the census of 1880, the United States Bureau of the Census began publishing life tables for various areas. The first tables for the entire United States have only recently been published; a table for the entire population based upon deaths registered in 1933 has been prepared by the Metropolitan Life In-

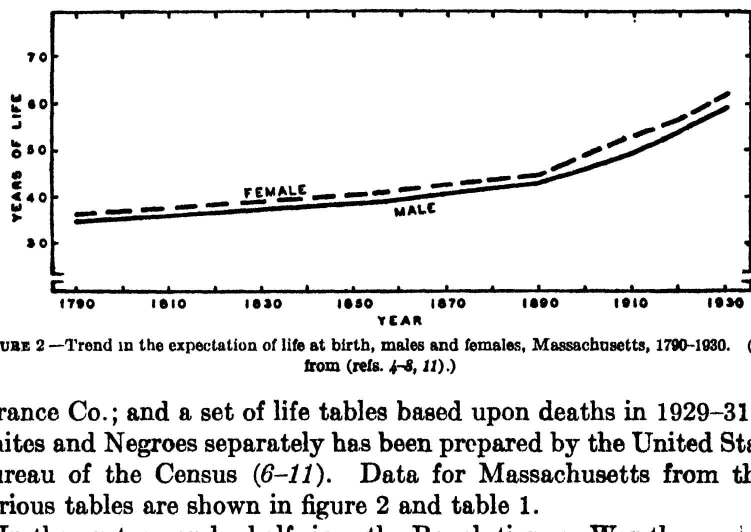

FIGURE 2.—Trend in the expectation of life at birth, males and females, Massachusetts, 1790–1930. (Data from (refs. *4–8*, *11*).)

surance Co.; and a set of life tables based upon deaths in 1929–31 for whites and Negroes separately has been prepared by the United States Bureau of the Census (*6–11*). Data for Massachusetts from these various tables are shown in figure 2 and table 1.

In the century and a half since the Revolutionary War the expectation of life at birth in Massachusetts has increased about 26 years for females and 24 years for males. More than two-thirds of this gain, however, has occurred since 1890. The remarkable increase in the average number of years of life remaining at each age becomes less marked in the older age groups, so that at ages 50 and over there apparently has been little or no increase and even slight losses in life expectancy (table 1).

For the older ages the expectation of life declined from 1880 to 1910 but increased between 1910 and 1930. The data in table 1 show an increase until 1878–82, followed by a sharp decrease, especially for the older ages. The exact cause of the change is not clear; it may be due to inaccuracies in the earlier figures or in the census data for 1880.

The life tables for 1890 and subsequent years are based on fairly reliable statistics and were constructed according to modern principles. The life table for 1878–82 was checked by a complete recomputation, but the new values were practically identical with those in table 1. Although these data do not seem reasonable, no plausible explanation of a possible source of error is available. However, the general conclusion can be drawn from the data in table 1 that improvements in health have resulted in keeping a larger proportion of the population alive until late adult life, but that people who reach late adult life can expect to live very little, if any, longer than such persons did a century ago.

TABLE 1.—*Average number of years of life remaining at selected ages, by sex, Massachusetts, 1790–1930*

Year	Age								
	0	10	20	30	40	50	60	70	80
	Male								
1789 [1]	34.7	43.1	33 9	29 9	25.4	20.5	14.8	9.6	5.6
1855 [1]	38.9	47.0	39.6	33 6	27.2	20.6	14 4	9 0	4 8
1878-82	41 7	49.9	42.2	35.7	28 9	22.0	15.6	10.3	6.9
1890	42.5	48.5	40.7	34 1	27 4	20.7	14.7	9 4	5.4
1900-02	46.1	50.2	41.8	34 5	27 2	20.2	13.9	8.9	5.1
1909 11	49 3	51.1	42.5	34 6	27.0	19 8	13 4	8.6	5 1
1919-20 [2]	54.1	53 3	44.6	36 6	28.8	21.2	14.4	8.9	5.0
1929-31 [2]	59.3	55.2	46.1	37.4	29.0	21 1	14.3	8 9	5 0
Change 1855-1930	20.4	8.2	6.5	3.8	1.8	0.5	−0.1	−0.1	0.2
	Female								
1789 [1]	36 1	43.3	34.4	30.6	26.6	21 8	16 0	10.5	6 1
1855 [1]	40 5	47.2	40.2	34.5	28.6	21.9	15.6	9.8	5 3
1878-82	43.5	50.0	42.8	36.7	30.3	23 5	16.9	11.3	7.4
1890	44.5	49.6	42.0	35.4	28.8	22.1	15.7	10.2	5.8
1900-02	49.4	52.1	43.7	36.2	28.8	21.6	15.1	9.6	5.6
1909-11	53.1	53.6	44.9	36.8	29.0	21.6	14.8	9.5	5.5
1919-20 [2]	56.6	54.3	45 5	37.8	30.0	22 3	15.3	9 6	5.2
1929-31 [2]	62.6	57.7	48.5	39.8	31.2	23.1	15.8	9.9	5.7
Change 1855-1930	22.1	10.5	8.3	5.3	2.6	1.2	0.2	0.1	0.4

[1] Estimated from data for both sexes combined.
[2] White population only.

These data probably cannot be considered representative of the trend in expectation of life for the entire United States except in a very general way. In addition to being a highly industrialized State, Massachusetts is unrepresentative of the entire Nation in the composition of its population. Moreover, the composition of the population has varied considerably during the past century.

According to table 2 the proportion of foreign-born whites in the population 45 years of age and over is not only much larger in Massachusetts than in the whole country but this proportion also increased much more rapidly in Massachusetts from 1880 to 1930 than in the entire United States. Since the mortality of the foreign-born is

higher than that of the native population, part, if not all, of the apparent increase in mortality during late adult life may arise from this change in the composition of the population.

TABLE 2.—*Percentage of foreign-born white persons in the total population at selected age groups, United States and Massachusetts, 1880 and 1930*

Age	1930		1880	
	United States	Massachusetts	United States	Massachusetts
45-54	21.9	46.9	30.1	40.8
55-64	25.0	46.0	28.8	32.5
65-74	26.5	43.1	24.2	24.3
75 and over	27.2	37.2	21.0	19.2

EXPECTATION OF LIFE IN NEW YORK CITY

In this connection it is interesting to contrast the trend in expectation of life in New York City with that in Massachusetts (fig. 3). During the past century and a quarter the expectation of life increased at every decade of life from 10 to 80 years, inclusive. No reliance can be placed in the apparently greater expectation of life at age 90 in 1805–8, owing to the small number of deaths involved. The comparison is limited to persons 10 years of age and over because the earlier census did not report separate ages under 10. It is interesting that the relative increases are nearly as great at the advanced ages as during middle adult life. The increases in average length of life shown in figure 3 are an understatement, since an appreciable proportion of the deaths undoubtedly were unrecorded in 1805–8.

CHANGES IN MORTALITY IN THE ORIGINAL REGISTRATION STATES, 1900–1930

Beginning with 1900, mortality statistics are available for about one-quarter of the population of the Nation residing in the six New England States, New York, New Jersey, Indiana, Michigan, and the District of Columbia. A large proportion of the population of these States lives in urban areas and is foreign-born or of foreign-born parentage. The trend in expectation of life of the white persons living in this area undoubtedly represents fairly accurately the trend for the urban white population of the United States but may be quite unlike that for the rural population, which is largely native born.

Since 1900, death rates at the younger age groups have decreased, but at the older ages the rates have changed very little (fig. 4). Except at ages 20–34, when the hazards of childbearing are greatest, this improvement in health has been relatively greater for women than for men. For both sexes the greatest gains have been in the groups under 45 years of age.

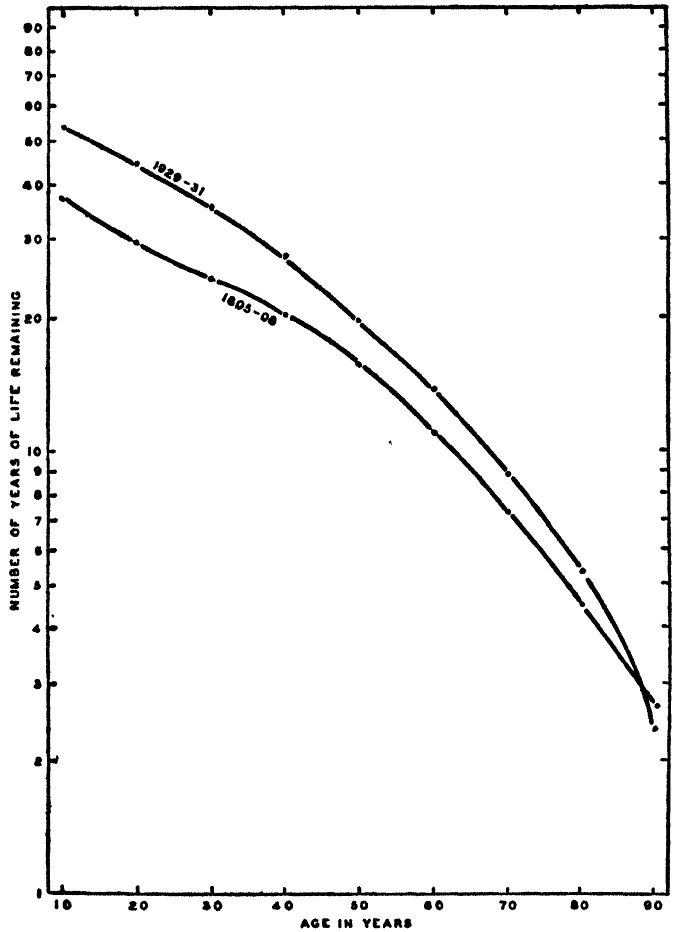

FIGURE 3.—Expectation of life at selected ages, total population, New York City, 1805–08 and 1929–31. (Semi-logarithmic scale. Data from Dalton (15).)

The effect of these changes in the mortality of white persons has been to increase the number of years an infant may expect to live by about 21 percent (fig. 5). This increase results primarily from the

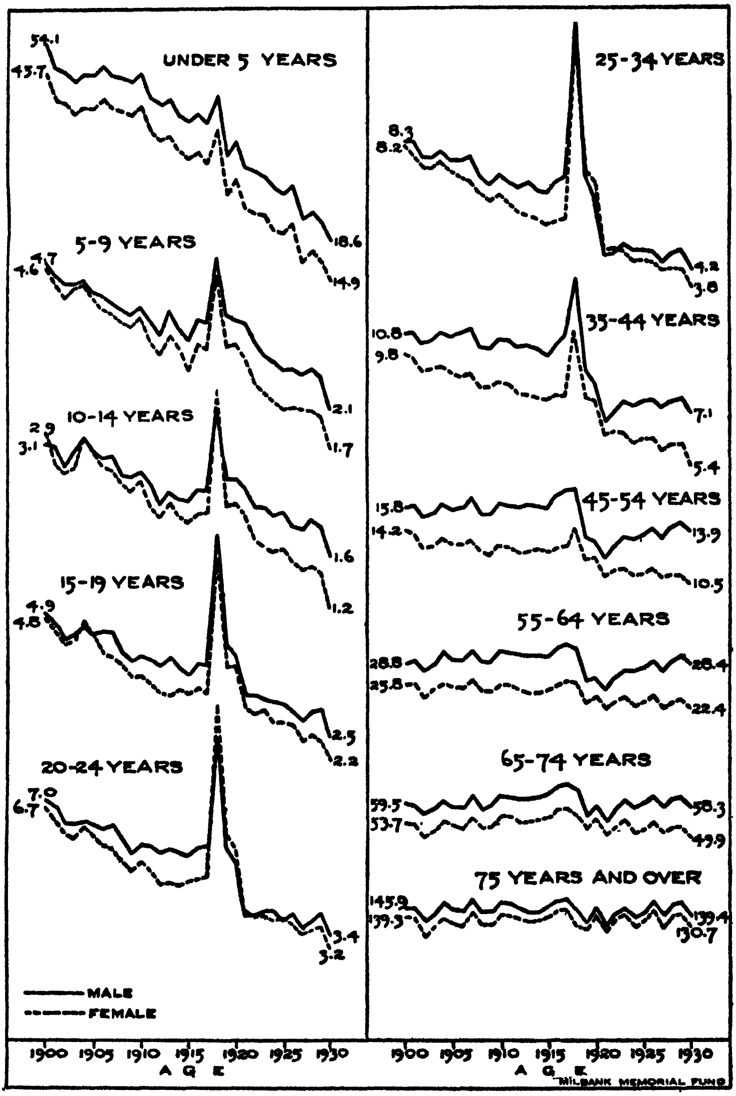

FIGURE 4.—Trend in the death rate at specified ages, original registration States, 1900–1930. (Semi-logarithmic scale. The death rate is the number of deaths per 1,000 population of each sex and is printed on the chart for the years 1900 and 1930. Reproduced from Sydenstricker (*13*), by permission.)

saving of life during childhood and adolescence. After age 50 there has been very little change in expectation of life, and indeed a slight, but insignificant loss for males 55–74 years of age.

EXPECTATION OF LIFE IN THE DEATH REGISTRATION STATES OF 1920

The change in mortality in the group of Northeastern States that were in the registration area in 1900 has been more favorable than

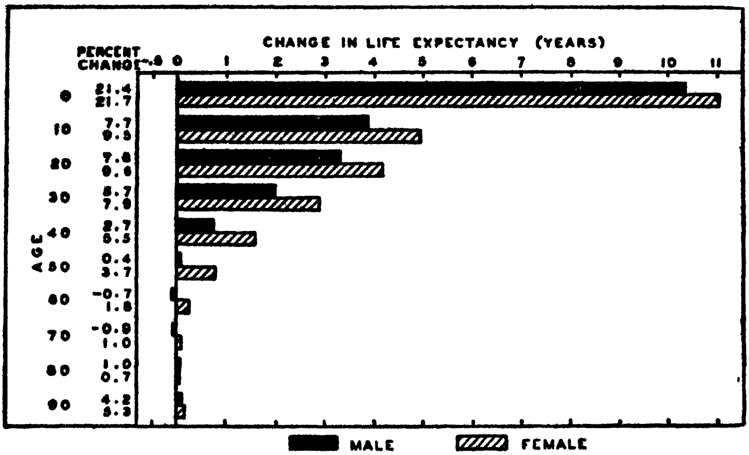

FIGURE 5.—Amount and percentage change in the expectation of life at selected ages, white males and females, original registration States, 1900–1902 to 1929–31.

that in the entire country. During the past decade, in the registration States of 1920, which include more than three-fourths of the entire population, the gains in expectation of life were confined to

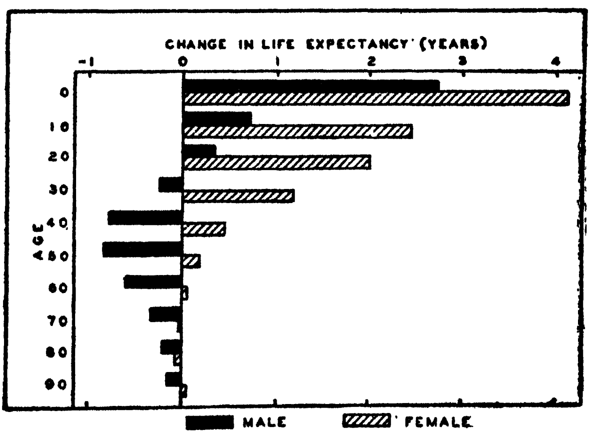

FIGURE 6.—Number of years gain or loss in expectation of life at selected ages, white males and females, death registration States of 1920, from 1919–21 to 1929–31.

males under 30 and to females under 70. Except at birth, the gains for males were insignificant; after age 30, the gains for females were only 2 percent or less (fig. 6).

This may be an understatement of the loss or, conversely, an overstatement of the gain in the expectation of life between 1920 and 1930. The crude death rate in 1921 was the lowest on record prior to 1930 with the exception of 1927. However, Collins has estimated that there were approximately 100,000 excess deaths from influenza and pneumonia in 1920 in addition to those occurring in 1919 from the pandemic of 1918–19 (*17*). In spite of these epidemics, the crude rate for 1919–21 was about 10 percent less than the average of the 5 years 1913–17 and only about 5 percent greater than the average of the 8 years 1922–29. It is safe to say that the losses in expectation of life shown in figure 6 are not overstated and there is some probability that the real losses actually are somewhat greater.

MORTALITY AMONG NEGROES

The improvement in health which is indicated by the increase in average length of life unfortunately has not been enjoyed equally by all classes of the population. Since 1920 the Negro males between 20 and 50 years of age have suffered a loss in expectation of life of more than 3 years at every age (fig. 7). This represents a loss of about 10 percent. Somewhat smaller losses occurred at every other age.

Only at birth did the expectation of life for Negro females show an appreciable increase. At all other ages the increases were insignificant or replaced by losses.

The expectation of life at any particular age, as computed in the life table, is influenced not only by the mortality for that specific age but also by the mortality for all older ages; changes in life expectancy, therefore, do not clearly indicate the changes that have occurred in mortality at specific ages. For this purpose mortality rates are preferable. Although these present a more encouraging picture, especially during childhood and adolescence, they also reveal a discouraging set-back in mortality at all ages over 30 for males and from 40 to 80 years of age for females (fig. 8). Mortality rates increased more than one-third among Negro males from 50 to 65 years of age. Although no direct evidence is available, part of the apparent increase in mortality rates may have resulted from more complete registration of deaths.

This situation in the Negro population presents a real challenge to public health workers. Of course part of this health handicap is a direct result of inferior education and adverse economic circumstances. At the present time the mortality among Negroes is higher than it was in the white population of the Northeast at the beginning of the century. A white baby may expect to live about 12 years

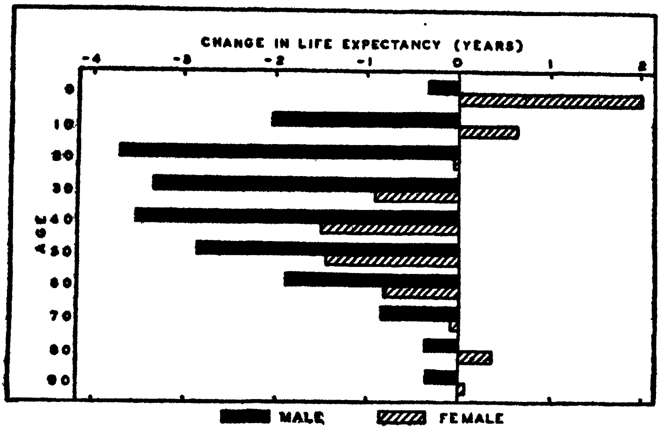

FIGURE 7.—Change in the expectation of life at selected ages, Negro males and females, death registration States of 1920, from 1919–21 to 1929–31.

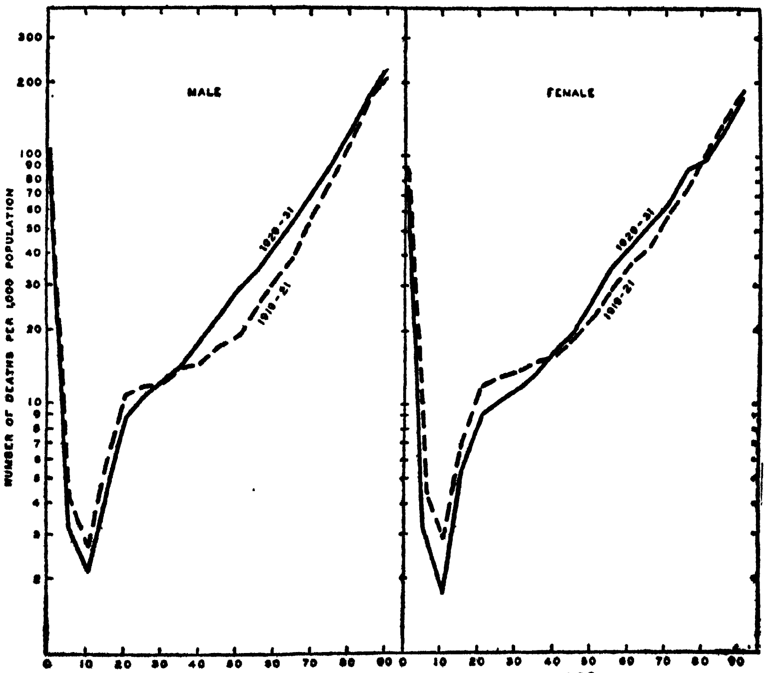

FIGURE 8.—Number of deaths per 1,000 population by age and sex for Negroes in the death registration States of 1920, in 1919–21 and 1929–31.

longer than a Negro baby. Even at age 20 a white person may expect to live nearly one-third longer than a Negro (fig. 9).

It is very doubtful that Negroes of advanced ages live longer than white persons of the same age as shown in figure 9. Owing to the tendency for elderly Negroes to overstate their age, the number in the older age groups as enumerated by the census is undoubtedly much too large. Consequently the mortality rates are too low and the expectation of life too high. The theory has been advanced that the greater expectation of life at advanced ages of Negroes is due to their higher mortality rates in earlier life. Theoretically, the weaklings die young and leave only a few hardy individuals who live much longer than white persons, who have not been subjected to so rigorous a

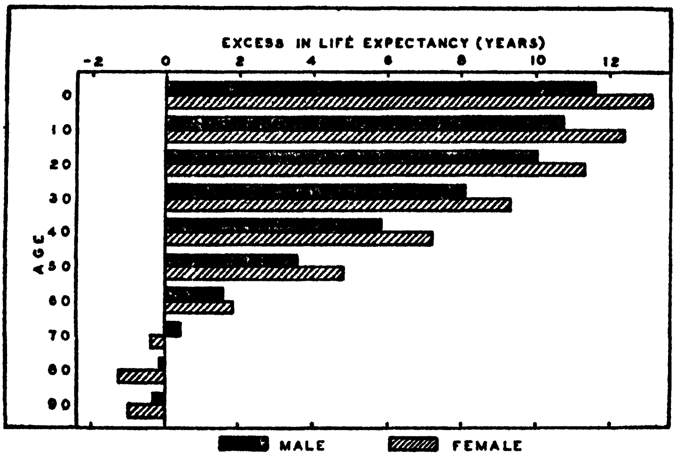

FIGURE 9.—Excess in expectation of life of white persons over Negroes of selected ages, by sex, United States, 1929-31.

selective process. This explanation, however, seems rather artificial in view of the well-known inaccuracy of age statistics of the Negro population.

On first thought, the increase in mortality among Negroes might be attributed to changes in residence and occupational status. During the decade of the twenties a large number of Negroes migrated from the South, where they had been engaged primarily in agriculture, to large Northern cities, where they sought employment mainly in domestic and personal service, semiskilled and unskilled occupations. Low wages, long periods of unemployment, insanitary living quarters, and the almost totally different environment may have had unfavorable effects upon health. However, the greatest set-back in health

seems to have been in the South. A comparison of figures 7 and 10 shows that the losses in expectation of life at different ages were from 2 to 5 times as great in the death-registration States of 1920 as in the original death-registration States. The original area included Negroes living in New England, New York, New Jersey, Michigan, Indiana, and the District of Columbia; the 1920 area included all of the Southern States except Georgia, Alabama, Texas, Arkansas, and Oklahoma in addition to the Northern States.

MORTALITY IN RURAL AND URBAN AREAS

The increase in expectation of life at birth since 1900 has been about 60 percent greater among persons living in urban than among persons

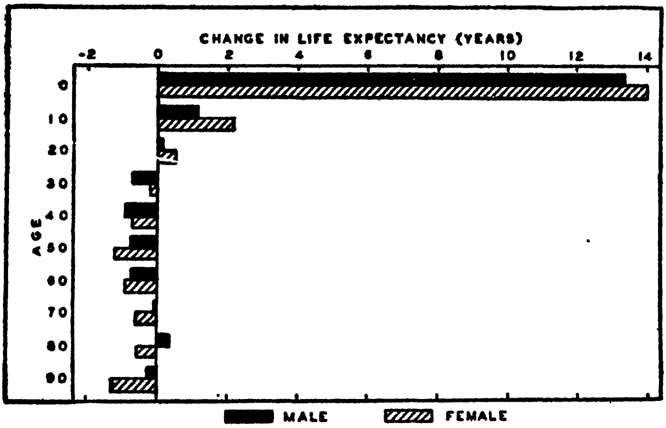

FIGURE 10.—Change in expectation of life at selected ages, by sex, among Negroes living in the original registration States, from 1900-1902 to 1929-31. (Data for 1929-31 include other colored in addition to Negroes and are from Dublin and Lotka (*11*).)

living in rural communities [1] (fig. 11). This comparison is not exact since the data for 1900 are for the original registration States while those for 1930 are for the entire United States, exclusive of Texas. The expectation of life for the white population in 1930 was about one-half year greater at all ages under 70 in the entire country than in the original registration States. This does not necessarily mean that the trend in mortality in the two areas has been exactly similar, but it does indicate that the error involved in the comparison of the two areas is not large.

[1] In 1930 all places of 10,000 or more inhabitants were classed as urban. In 1900-1902, all places of 8,000 or more inhabitants were classed as urban.

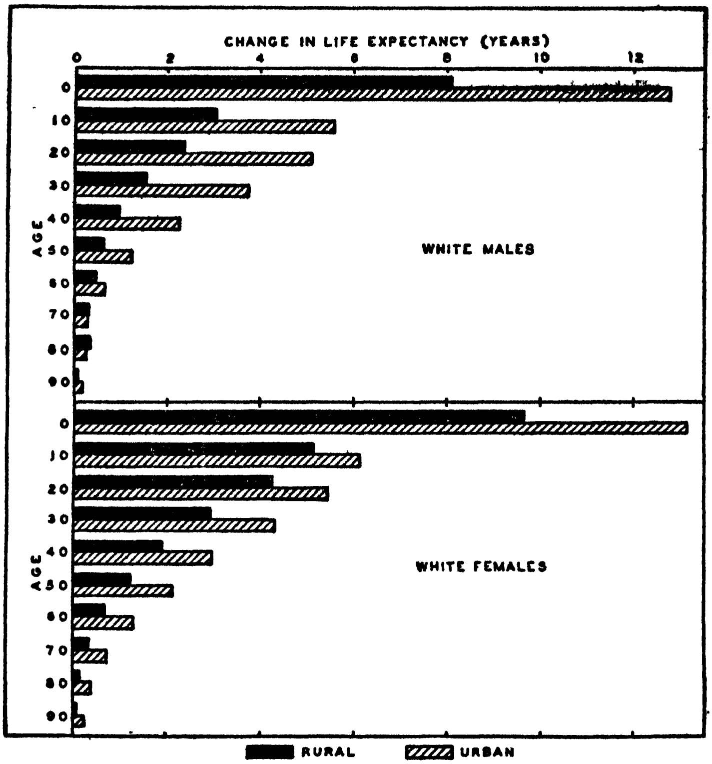

FIGURE 11.—Change in expectation of life at selected ages, by sex, among white persons in rural and urban communities, 1900–1902 to 1930. (Data for 1930 are from Dublin and Lotka (*11*).)

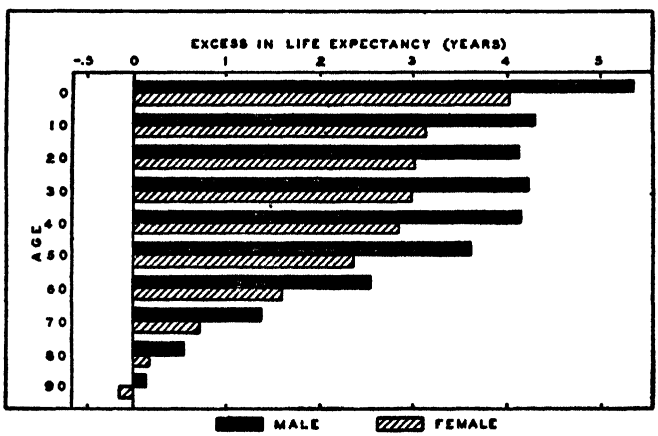

FIGURE 12.—Excess in expectation of life of rural over urban inhabitants of selected ages, white population, male and female, United States, 1930. (Data are from Dublin and Lotka (*11*).)

The expectation of life increased more rapidly for urban males than for urban females, but in rural communities the reverse was true. The greater occupational risks of urban males, however, are revealed by the fact that in 1930 the advantage in expectation of life of rural as compared with urban residents is from one-third to one-half greater for males than for females (fig. 12). In spite of the more rapid decline in mortality in urban communities since 1900, rural males in 1900–1902 had a greater expectancy of life at all ages over 1 year than did urban males 30 years later. In other words, the remarkable gains in healthfulness during the past 30 years have merely advanced the urban population to the level attained by the rural population at the beginning of the century. The difference between females is less than that between males; but even so, white women between 30 and 80 years of age living in urban communities in 1930 could not expect to live as many years as rural women of the same ages in 1900. This is a slight overstatement of the actual differences, since deaths of rural residents occurring in urban hospitals were not allocated to the usual place of residence.[2]

GEOGRAPHIC VARIATIONS IN EXPECTATION OF LIFE AT BIRTH

Extreme differences in mortality rates exist throughout the Nation. The expectation of life at birth in 1929–31 for the white population, including Mexicans, was 14 years greater in South Dakota than in Arizona. It is quite possible that a small proportion of the deaths are unregistered in South Dakota, thus raising the expectation of life, and that the expectation of life in Arizona is lowered by the inclusion of Mexicans and invalid persons, especially persons with tuberculosis who have migrated to the State because of ill health. The difference between Kansas, which ranks second, and South Carolina, which ranks forty-fourth, is 5 years.

The areas of highest mortality or lowest expectation of life are in the Southwest, which is partially explained by the inclusion of Mexicans, Indians, and invalid persons,[3] and along the Atlantic coast from Maine to Florida (fig. 13). The areas are much the same for both males and females, except that the expectation of life at birth is also relatively low among females living in Michigan, Indiana, and Kentucky.

The greatest expectation of life for both males and females is in the tier of eastern Great Plains States from North Dakota to Okla-

[2] Preliminary tabulations of the Division of Vital Statistics of the Bureau of the Census for 17 States and the District of Columbia indicate that the recorded rural death rate may be from 10 to 15 percent lower than the resident rate with the urban recorded death rates correspondingly higher than the resident rates (*19*). The possibility of less complete registration of deaths in rural than in urban areas is another source of error that must not be forgotten in urban-rural comparisons.

[3] Migration of laborers to and from Mexico may also be a source of error in the census count of the population.

homa. The residents of the Northwest States also have an expectation of life greater than the Nation as a whole.

During the decade of the twenties the greatest relative increases in expectation of life at birth were in the Northeast (New England and Middle Atlantic regions) and the smallest relative increases were in the

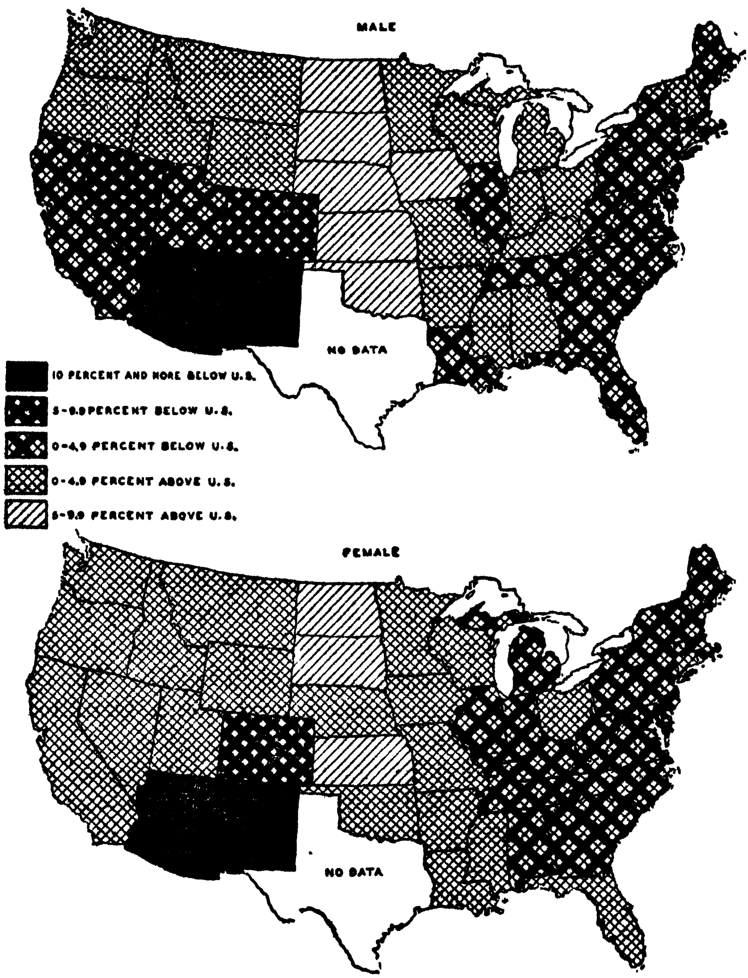

FIGURE 13.—Expectation of life at birth as a percentage above or below that for the United States, white population, by States, 1929-31. (Data are from Dublin and Lotka (11).)

Southeast for both males and females. The changes were larger and less variable for females than for males. The relative increases among males were about four times as great in the Northeast as in the Southeast; among females the relative increases were about twice as great in the Northeast as in the Southeast.

EXPECTATION OF LIFE FOR THE TOTAL POPULATION

It is interesting to compare the first life table for the entire population of the United States based on deaths in 1933 with a similar table for the total population of the original registration States for the period 1900–1902 (table 3). It should be remembered that the crude death rate in 1933 was the lowest recorded. But even though it is slightly below the average since 1930 it does represent a level of health which is attainable. A child born in the United States in 1933 could expect to live 12 years longer than his parents could have expected to live at their birth. Another way of measuring the change in longevity that has occurred during the past generation is to compare the ages at which any given percentage of a population would have died if subjected throughout its lifetime to the mortality prevailing at the beginning and end of this period (table 4).

TABLE 3.—*Expectation of life at selected ages for the total population of the original registration States, 1900–1902, and the total population of the United States, 1933* [1]

Age	Original registration States, 1900–1902	United States, 1933	Years increase	
			Number	Percent
0	49 24	61. 26	12 02	24. 4
1	55. 20	63 67	8 47	15. 3
2	56. 10	63. 21	7. 11	12 7
3	55. 98	62. 47	6 49	11 6
4	55 55	61. 65	6. 10	11. 0
5	54 98	60. 80	5. 82	10. 6
10	51 14	56 25	5. 14	10. 0
15	46. 81	51. 61	4. 80	10. 3
20	42 79	47. 16	4. 37	10. 2
25	39. 12	42 88	3. 76	9. 6
30	35. 51	38 64	3. 13	8. 8
35	31. 92	34. 45	2. 53	7. 9
40	28. 34	30. 34	2. 00	7. 1
45	24. 77	26 34	1. 57	6. 3
50	21. 26	22. 52	1. 26	5. 9
55	17 88	18. 89	1. 01	5. 6
60	14. 76	15. 50	. 74	5. 0
65	11. 86	12. 46	. 60	5. 1
70	9. 30	9. 75	. 45	4. 8
75	7. 08	7. 49	. 41	5. 8
80	5. 30	5. 59	. 29	5. 5
85	3. 96	4. 13	. 17	4. 3
90	2. 95	3. 09	. 14	4. 7

[1] Data for 1933 are from reference 10.

TABLE 4.—*Age at which a specified proportion of the population would be dead*

Percentage dead	Age (in years)	
	1901	1933
25	24	52
50	58	68
75	74	78

One-fourth of a group of children subject to the mortality conditions prevailing in 1901 would have died before their twenty-fifth birthday; under the mortality conditions of 1933, the corresponding age would be 52. This remarkable increase reflects the extraordinary achievements in preventive medicine, sanitation, and public health, together with a rising standard of living.

For the convenience of readers, the expectation of life at selected ages for the white and Negro populations is summarized in tables 5 and 6.

TABLE 5.—*Expectation of life at selected ages by sex for the white population of certain areas of the United States, 1900–1930* [1]

Year	0		20		40		60		80	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Original death registration States									
1900-02	48.2	51.1	42.2	43.8	27.7	29.2	14.4	15.2	5.1	5.5
1909-11	50.2	53.6	42.7	44.9	27.4	29.3	14.0	14.9	5.1	5.4
1919-20	54.1	56.4	44.3	45.2	28.9	30.0	14.6	15.3	5.2	5.6
1929-31	58.8	62.1	45.5	48.0	28.5	30.8	14.3	15.5	5.2	5.5
	Death registration States of 1920									
1919-21	56.3	58.5	45.6	46.5	29.9	30.9	15.3	15.9	5.5	5.7
1929-31	59.1	62.7	45.9	48.5	29.1	31.4	14.6	16.0	5.3	5.6
	Total United States									
1929-31	59.1	62.7	46.0	48.5	29.2	31.5	14.7	16.1	5.3	5.6
1933	60.9	64.4	46.8	49.5	29.7	32.1	14.9	16.3	5.3	5.7

[1] Data are from references 7 to 11, inclusive.

TABLE 6.—*Expectation of life at selected ages by sex for the Negro population of certain areas of the United States, 1900–1930*

Year	0		20		40		60		80	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	Original death registration States									
1900-02	32.5	35.0	35.1	36.9	23.1	24.4	12.6	13.6	5.1	6.5
1909-11	34.1	37.7	33.5	36.1	21.6	23.3	11.7	12.8	5.5	6.1
1919-20	40.5	42.4	35.7	36.4	23.6	23.7	12.8	12.9	4.7	5.8
1929-31 [1]	45.9	49.1	35.2	37.4	22.2	23.7	11.9	12.7	5.5	5.9
	Death registration States of 1920									
1919-21	47.1	46.9	38.4	37.2	26.5	25.6	14.7	14.7	5.8	6.6
1929-31	46.8	48.9	35.7	37.1	23.0	24.1	12.9	13.9	5.5	6.9
	Total United States									
1929-31	47.6	49.5	36.0	37.2	23.4	24.8	13.2	14.2	5.4	6.9

[1] Data relate to colored population, of whom 95 percent were Negroes.

THE ULTIMATE EXPECTATION OF LIFE

What of the future? Can these gains be repeated during the next generation? It seems impossible that such will be the case unless mortality in adult life and old age is remarkably reduced. This means that the death rates from cancer, diabetes, heart diseases, nephritis, and cerebral hemorrhage must be lowered.

To achieve the same increase in expectation of life at birth during the next generation that took place during the past generation, every newborn infant would have to live until about age 55 unless there is a sharp decrease in mortality at the older ages (table 7). Although the figures in table 7 are quite unreal, they do indicate that the remarkable progress of the past cannot be repeated until methods of controlling the diseases of adult life are discovered.

TABLE 7.—*Expectation of life at birth if everyone lived until certain specified ages and then died according to mortality conditions in 1933*

Age at which the first death occurs	Expectation of life at birth
10	66 25
20	67 16
30	68. 64
40	70. 34
50	72. 52
60	75 50

Some indication of the possible future increase in expectation of life can be obtained from a comparison of the United States with various other countries.

TABLE 8.—*Expectation of life at birth by sex in various countries*

Country	Year	Male	Female
New Zealand	1931	65 0	67. 9
United States, white	1933	60. 9	64. 4
Holland	1921–30	61 9	63. 5
Denmark	1926–30	60 9	62. 6
Germany	1933	59 8	62. 6
Canada	1930–32	59 0	60. 7
England	1933	58. 7	62. 6
Scotland	1930–32	56. 0	59. 5
Austria	1930–33	54 5	58. 5
Italy	1930–32	53. 8	56. 0
India	1931	26. 9	26. 6

Although the position of the United States is very gratifying in comparison with that of most European nations, we still are not as favorably situated as New Zealand.

The estimated future expectation of life.—On the basis of past experience in this country and in New Zealand, Dublin and Lotka have

prepared a hypothetical life table representing a prediction of the ultimate longevity attainable with present knowledge (table 9 and fig. 14). According to this table the expectation of life at birth may eventually be increased to about 70 years, or 21 years greater than that existing in 1900. In order to achieve this, however, very substantial reductions in mortality during adult life will be necessary. Opinions may differ as to the possibility of these reductions, but at least it indicates

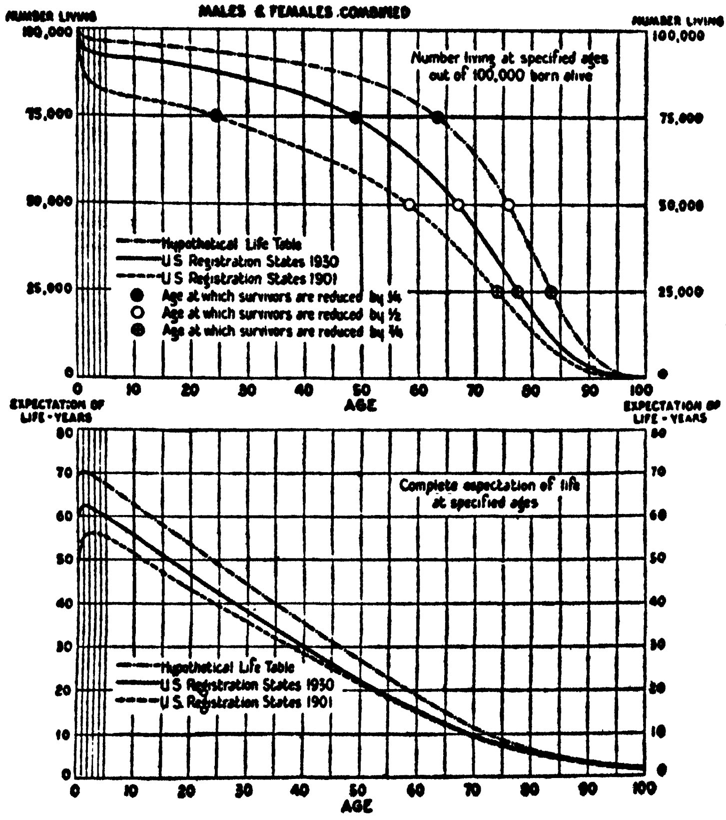

FIGURE 14.—Number of survivors out of 100,000 births and expectation of life by age, total population, 1901 and 1930 compared with hypothetical values attainable with present knowledge. (Reproduced from Dublin and Lotka (*16*), by permission.)

the diseases which preventive medicine must conquer if any appreciable improvement in mortality is to be achieved.

The increase in the aged.—One feature of particular interest is the change in the age distribution of the population which would result from the attainment of the life expectancies of table 9 in the absence of immigration or emigration. Under the mortality conditions prevailing in 1933, 75 out of every 100 persons would still be alive at age 52. In the ultimate life table this age is advanced to 63. Fifty

out of every 100 persons would still be alive at age 76, as compared with age 68 in 1933. Of course this aging of the population would not occur rapidly but would be a gradual process extending over approximately a century after the expectation of life indicated in table 9 had been achieved and would be altered by changes in the birth rate. However gradually these improvements in mortality occur, they inevitably presage an increase in the number, and almost certainly in the proportion also, of elderly persons in our population, unless they are accompanied by an increase in the birth rate, which seems improbable. The problem of caring for the aged, many of whom cannot be self-supporting, will increase rather than diminish. These problems will become especially pressing in the field of mental health and hygiene, since the present tendency is to decrease the length of the period of employability. The proportion of the population 45 years of age and over which is gainfully employed has been declining for several years. As the proportion of the population in these age groups increases, more attention will probably be given to the obvious solution of providing useful employment for persons past middle life.

TABLE 9.—*Hypothetical life table representing the ultimate longevity attainable with present knowledge* [1]

Age x	Number attaining age x out of 100,000 born alive l_x	Mortality rate $1000q_x$	Percent reduction in mortality from that prevailing in 1933	Expectation of life [2] $\overset{\circ}{e}_x$
0	100,000	25.00	53	69.93
1	97,500	3.31	61	70.71
2	97,174	1.97	52	69.95
3	96,983	1.82	38	69.09
4	96,807	1.73	25	68.22
5	96,639	1.50	22	67.34
10	96,144	.56	53	62.67
15	95,843	.99	45	57.85
20	95,221	1.61	44	53.21
25	94,360	2.18	39	48.66
30	93,216	2.80	32	44.23
35	91,858	3.09	39	39.83
40	90,438	3.15	50	35.41
45	88,875	4.31	49	30.98
50	86,698	5.80	50	26.69
55	83,876	8.32	48	22.50
60	79,645	13.83	42	18.55
65	73,240	21.05	39	14.94
70	64,508	32.69	38	11.60
75	52,327	56.65	27	8.69
80	36,391	91.15	22	6.38
85	19,914	152.56	12	4.60
90	7,546	212.96	14	3.44

[1] From Length of Life (p. 194), by Dublin and Lotka.
[2] The expectation of life given in this column is based on the assumed mortality rates in column 2.

SUMMARY

In 1930 the expectation of life at birth was 59 years for white males and 63 years for white females. The corresponding expectations for Negroes were 48 and 50 years, respectively.

About 150 years ago, at the close of the Revolutionary War, the expectation of life at birth in the United States was approximately 30 to 35 years. By 1930, in Massachusetts, it had increased about 26 years for females and 24 years for males.

The decline in mortality rates has been most rapid for the ages of childhood, adolescence, and early adult life. For the ages above 50 years, mortality rates, have remained practically unchanged.

The increase in expectation of life since 1900 is equal to the increase in the previous 100 years.

Changes in mortality rates in the original registration States have been generally similar to those in Massachusetts. In the death registration States of 1920 the gains in expectation of life in the white population during the twenties were confined to males under 30 and to females under 70 years of age.

Since 1920, Negro males between 20 and 50 years of age have suffered a loss in expectation of life of more than 3 years at every age. Only at birth did the expectation of life for Negro females show an appreciable increase. At every other age the increases were insignificant or replaced by losses.

The increase in the expectation of life at birth since 1900 in the white population has been about 60 percent greater among persons living in urban than among persons living in rural communities. In spite of this, rural males in 1900–1902 had a greater expectation of life at all ages over 1 year than did urban males of corresponding ages 30 years later. A white woman between 30 and 80 years of age living in an urban community in 1930 could not expect to live as many additional years as a white woman of the same age living in a rural community in 1900.

The areas of highest mortality in the white population are in the Southwest, which is partially due to the inclusion of Mexicans and invalid persons, and along the Atlantic coast from Maine to Florida. The greatest expectation of life for both males and females is found among persons living in the Northwest, especially in the eastern tier of Great Plains States from North Dakota to Oklahoma.

The remarkable increase in expectation of life at birth which has occurred since 1900 cannot be repeated in the next generation unless methods are developed for preventing and controlling the diseases of middle life and old age. It has been estimated that the ultimate longevity attainable with present knowledge is about 70 years, or about 10 years greater than in 1930.

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AN APPROACH TO A RURAL MENTAL HEALTH PROBLEM

By J. Allen Jackson, M. D., *Superintendent of the Danville State Hospital, Danville, Pa.*

The proper approach to the rural mental health problem is one of the most stimulating challenges to psychiatry in this day and generation. Unlike the population of urban communities, wherein are situated teaching centers, psychiatric hospitals, hospitals with psychiatric departments, out-patient clinics, child guidance clinics, psy-

chiatrists, and others well versed in psychiatric problems, adequate medical school inspection, available psychologists and psychiatric social workers, vocational and orthogenic classes, the rural population depends wholly upon the medical profession and the mental hospitals, State and county. The challenge of the rural mental health problem, therefore, must be met by State welfare departments, commissions on mental disease, State health departments, the mental hospitals, and the medical profession. The question of governmental set-up, whether mental hospitals should be under the jurisdiction of a State department of health, welfare department, or commission, is not necessarily pertinent to this discussion. The size of the commonwealth, the stability of its departments, and the efficiency of their functioning must necessarily decide these matters. Regardless of the type of State or governmental administration, the fact still remains that the psychiatric service rendered to a rural community must be provided by the county medical societies and the mental hospitals, school, or institution in that particular community. The time seems far distant when there will be available sufficient psychiatrists to man each county with adequately trained psychiatrists, regardless of how pressing this goal should be.

In the approach to a rural mental health problem, there should be a satisfactory working arrangement with the county medical society, and the State hospital representing the State department in the district in which the hospital is located, to meet the community needs. A pattern is represented by the Danville State Hospital, which functions on such an arrangement. For almost 17 years the Danville State Hospital has been the mental health center of its district, and the working arrangement with the county societies in its district has been most harmonious. This has, no doubt, been due to the fact that the hospital has in no way attempted to usurp the prerogatives of the physicians of the district; but, on the contrary, has tried in every way possible to cooperate with the county societies in the operation of mental clinics, providing programs for the county societies, holding an annual mental hygiene meeting at the hospital for the physicians of the district, examining cases, giving counsel and advice as to humane treatment, care, and supervision, investigating commitments, and making confidential reports of the examination of the committed and voluntary cases, and stimulating an interest in furlough cases as well as in the patient while in the hospital. At no time has there ever arisen the question of State medicine; but, on the contrary, the medical profession has been more appreciative than the service we were able to give them warranted. Such is the harmonious relationship after many years.

In presenting the approach of the medical profession and the Danville State Hospital, the writer is conscious that there may be other patterns followed by State hospitals or by the medical profession. In justice to this hospital and to the medical profession it might be pointed out, however, that it was possibly one of the first patterns of its kind, including a community service department, embracing education and information in mental health matters; the establishment of mental clinics; the cooperation of the medical profession, schools, colleges, and universities in its district; the cooperation of general hospitals; the erection of a special diagnostic clinic for purely voluntary types of patients; the establishment of child guidance clinics; raising the standards of the hospital proper to render the best treatment and care possible; pioneering in the boarding out of mental patients with the cooperation of the overseers of the poor and without cost to the State; building up an adequate social service department with its present set-up; and functioning for almost 17 years. It is felt that the mental health problems of the 15 counties, largely rural, embracing approximately 10,232 square miles with a census of approximately 1,293,400 (this hospital serving 771,421 persons of this approximate census, and county institutions serving the other 521,979) are not without some psychiatric counsel and leadership.

THE PATTERN

Briefly the pattern is as follows: The hospital, administratively, is divided into six divisions; namely, the executive and fiscal division; the division of operations; the division of agriculture; the division of medical service; the division of laboratories; and the division of community service. To the medical service are assigned physicians, nurses, and vocational and technical assistants. To the community service division are assigned persons whose functions relate to public information (through the press, radio addresses, service clubs, colleges, universities, and high schools), mental clinics, and the social-service departments.

PUBLIC EDUCATION

In the matter of public information, the material used has been simple in presentation. A weekly release to the press has centered around two interesting phases—the one an attempt to break down, as it were, the false concepts concerning mental hospitals as to their nature, policies of administration, the care and treatment of patients, diversion, and recreation, and the other a mental health talk dealing with some aspect of community mental health, mental diseases, etc. In a year's time, approximately 4,458 inches of newspaper space has been given to such material.

For service clubs, a film entitled "The Role of the Danville State Hospital in Mental Hygiene", is presented. This, briefly, embraces the entire hospital set-up in all of its divisions. For high schools, colleges, and universities, and for students who visit the hospital, a program is presented consisting of the moving pictures followed by a visit through all the hospital departments. For high-school students we use a little more restricted visitation on account of the age of the students (seniors).

MENTAL CLINICS

The nine mental clinics in the field carry the hospital into the most strategic positions of the district. The function of a mental clinic is so well known that repetition is unnecessary, other than to say that they serve the physicians, the courts, the schools, and the social agencies in the case of those patients who have no family physician (an effort is made that all cases should be first seen by their family physician and a report is always sent to him) in the matter of counsel, diagnosis, recommendations as to home care under the physician, general hospital commitments, and the follow up of furlough cases from the hospital. Let it be understood that the clinics in no way usurp the physician's prerogatives; but, on the contrary, aid him in caring for his psychiatric problems. The clinic hours are arranged for adults, children, and furlough cases.

GENERAL HOSPITALS

It has been a source of gratification to acknowledge the cooperation of the general hospitals, particularly those where the superintendent and his staff are consultants. Many cases have been seen and guided to an adjustment without commitment to a mental hospital.

DIAGNOSTIC CLINIC

Early in the approach it was recognized that there was a large group of cases for whom the general hospital was not suited; nor were they comfortable in the acute-treatment services of the mental hospital. For this group was set up a diagnostic clinic of 44 beds, equipped in all respects for diagnosis and treatment for a short period of the voluntary border-line patient, separate and distinct from the hospital patients, but sufficiently close for administrative purposes. This unit carries its own personnel.

RESULTS

A set-up without a check on function affords little information on achievement. The results very briefly are as follows: During the intervening years, in the matter of public information and contacts with the public press, we have endeavored to reach the greater part

of our population through weekly releases to the press, these releases dealing with different phases of hospital administration, trustees' meetings, and a monthly mental health talk. In addition, we have had active contact with the colleges and universities in our district by a program ranging from a course of lectures on mental hygiene, followed by case demonstrations at the hospital, to our present program, which consists of visits of the students from these colleges and universities to the hospital during their regular academic year and during their summer sessions. Likewise, the senior classes of high school students in our district visit the hospital during their school term. We have had contact with the service clubs and other civic organizations throughout the hospital district with the spoken word, as well as with the visualization method by presenting the hospital activities in motion pictures. Also, there has been published quarterly a Mental Health Bulletin, dealing with various mental health topics, which is mailed to over 1,325 physicians, overseers of poor, colleges, universities, hospitals, libraries, and commissions throughout the United States. With such a program it is impossible to estimate in numbers the contacts made by the hospital, but they run into several hundred thousands.

During the past 17 years the hospital has conducted clinics under the direction of the clinical director, Dr. H. V. Pike, and his associates, consisting of an internist, a social worker, and a psychologist. At the present time we are conducting nine such clinics at strategic points in the hospital district, namely, Bloomsburg, Danville, Hazleton, Kingston, Lock Haven, Mt. Carmel, Shamokin, Sunbury, and Williamsport. Up until 1932 we also conducted such a clinic at Mansfield. It is interesting to note that since this service was organized, we have rendered service to approximately 11,092 new cases, 6,815 return cases, and 15,911 furloughed cases. As stated before, these clinics have been of service to the physicians of the hospital district, the courts, the schools, and the social agencies. It is also interesting to observe that, of the new cases seen in the field, only 15 percent require hospitalization. The social service department has been functioning in full force and carrying an annual case load of approximately 1,566 extramural contacts, 2,800 intramural contacts, and an average correspondence of approximately 5,500 letters and clinic notices.

In addition to the foregoing, members of the medical staff have served as consultants to the general hospitals, have provided lectures for the schools of nursing of general hospitals, and have prepared papers for medical societies and for publication.

As to the hospital proper, until a few months ago, when the hospital was closed to admissions, owing to overcrowded conditions, our admission rate was rather high. During the calendar year 1936,

there were admitted to the hospital 766 patients. During that same year 444 patients were discharged and 227 patients died. We average about 420 patients on furlough. On September 1, 1937, there were 1,919 patients under treatment in the hospital and 403 patients on furlough. Of the 766 patients admitted during 1936, 142 represented the patients admitted to the diagnostic clinic as voluntary patients. It is interesting to note the very free use made of this clinic by the voluntary type of patients. Prior to the opening of the clinic, we averaged only one or two voluntary admissions a month to the hospital proper.

Meeting the challenge of a rural mental health problem is one of psychiatry's most fascinating problems. Many patterns of approach have come and gone, while some remain. Of those that remain, none can yet be said to be perfect; but the principles of those that remain will become the foundation stones of the more nearly perfect pattern that is yet to be evolved.

Challenging, indeed, are the isolated areas in which beliefs in devils, the changing lunar seasons, witchcraft and sorcery, and horrors of the asylum stand between the unfortunates and humane care and treatment. Many are the areas in which a harrowing trip with some loved one over the mountain to the asylum carries with it horrors of abuse and neglect, and lost hopes that are difficult to revive. Challenging, indeed, are many of these asylums which add to this melancholy belief. Likewise, from out of this mental health chaos is a seemingly endless file of children, without supervision and guidance, whose destiny is likely to be a "last ride over the mountains."

It was challenges like these that stimulated the pioneer work at the Danville State Hospital and that have spurred on the workers. Many of those who supported that work and the workers have long since passed on, surely to their just reward. Their names are inseparable from the work that has been done and should be remembered in that yet to be accomplished. Great credit must be given to the venerable board of trustees of the early years, who sensed the responsibility of the mental health of the community and attempted to meet the challenge. With this group, too, must be mentioned the general practitioners—yes, country doctors—who sponsored the physician relationship; the assistant superintendent, the late Dr. George B. M. Free, who cared for intramural matters while some of the others of us were traveling evangelists; the present incumbent, Dr. L. R. Chamberlain; the secretaries of the Department of Welfare and Dr. William C. Sandy, Director of the Bureau of Mental Health; the hospital superintendents; the judges of the court; the educators of the past and present; the public press, and our brilliant press cor-

respondent, the late Mr. Reed McCarty; the welfare agencies and social clubs; the nurses and social workers; and a faithful secretary, Pearl L. Hodge, who kept all the threads together! Special reference must be made to Dr. H. V. Pike, the first clinical director, who retires from the service in November, but leaves behind him an enduring monument in his clinical activities and in deeds well done. I mention these especially to emphasize that no pattern of approach to rural mental health problems can be made to function without such cooperation and support.

HEALTH SUPERVISION BY NURSES IN A BICOUNTY HEALTH DEPARTMENT [1]

Brunswick-Greensville Health Administration Studies No. 9

By ROSALIE I. PETERSON, *Assistant Public Health Nursing Consultant, United States Public Health Service*

Public health nursing activities in county health departments may be grouped according to four categories: (1) Those activities concerned with the acute control of contagion, (2) those functions designed to decrease the spread of tuberculosis and venereal disease, (3) those procedures focused on the supervision of the maternity cycle, and (4) all other nursing services, commonly called health supervision, designed to improve general health. This fourth group includes such activities as advice and information regarding health habits, correction of physical defects, immunization against preventable disease, food habits, and advice regarding specific health problems of the individual.

A general analysis of the total nursing situation and detailed descriptions of the first three types of nursing activities in the Brunswick-Greensville area have already been presented (*1*, *2*, *3*, *4*). It is the purpose of this paper to analyze the health supervision service rendered by nurses in these two counties in regard to its volume, its clientele, and its type.

The basic data for this analysis were furnished through the health department records which described the actual services rendered by two public health nurses during a period of 12 months. Included as a supplement to the health department records is some of the information obtained during the study year from a survey of the health problems and environment of 1,009 representative families in the bicounty area (*5*).

[1] From Division of Public Health Methods, National Institute of Health, in cooperation with Division of Domestic Quarantine. Special thanks are due to Miss Pearl McIver for assistance in the analysis of the data for this paper.

VOLUME OF HEALTH SUPERVISION SERVICE

General health supervision was found to be a major activity of the two nurses in this area. Almost half of the individuals served by the nurses in the two counties were given advice of a health supervisory nature. Proportionately this type of activity was given much greater emphasis in Brunswick than in Greensville County. Of the total individuals served, the percentages given health supervision were 50 and 39 in the two respective counties.

TABLE 1.—*Number and percentage of individuals served by the nurses in the two counties according to type of service rendered*

Type of service	Individuals served by the nurses					
	Number			Percentage		
	Total	Brunswick	Greensville	Total	Brunswick	Greensville
Total	[1] 1,114	[1] 702	[1] 412	[1] 100 0	[1] 100 0	[1] 100.0
Health supervision	511	349	162	45.9	49.7	39.3
Control of contagion	125	75	50	11 2	10.7	12.1
Tuberculosis	288	147	141	25.9	20.9	34.2
Maternity	234	153	81	21 0	19 7	21.8

[1] More than 1 type of service was rendered to some of the individuals during the study year.

Although the health supervisory services were the most extensive of the four types, the degree of intensity, in terms of the number of home visits, was somewhat low. On the average, the total 1,114 individuals given service by the nurses during the study year received 1.8 visits, while the health supervision cases received only 1.4 visits. As shown in table 2, only one home visit was made to two-thirds of those who were given advice regarding hygiene.

The nurse in Greensville County gave a more intensive service to the small group of individuals which she served. An average of 2.0 visits were made to each of her cases as compared with 1.4 visits per case made by the Brunswick County nurse.

TABLE 2.—*Number of individuals given health supervision service in the home according to number of home visits each received*

Number of home visits	Individuals given health supervision service in the home					
	Number			Percentage		
	Total	Brunswick	Greensville	Total	Brunswick	Greensville
Total	479	341	138	100.0	100.0	100.0
1	325	257	68	67.9	75.4	49.3
2	84	53	31	17.5	15.5	22.5
3	48	26	22	10.0	7.6	15.9
4 or more	22	5	17	4.6	1.5	12.3

In addition to the service rendered in the homes, 88 individuals made a total of 174 visits to the offices of the nurses, where they were given instruction on health problems.

The lack of continuity, as portrayed by these data, in a type of service that depends on continuous follow-up for best results, limits the value of this activity. However, it must be pointed out in connection with such considerations that each of these nurses was rendering service to approximately 17,000 individuals scattered in a rural area, thereby making a continuous intensive service to such a large group almost impossible.

RECIPIENTS OF THE HEALTH SUPERVISORY SERVICES

Since the records of the nurse supplied information as to race, economic status, and age, it was possible to compare, on the basis of these characteristics, the health supervision cases with the total number of individuals receiving nursing service and also with the aggregate population of the two counties.

The race distribution of the total of 1,114 individuals served by the nurses corresponded closely to the proportions of whites and Negroes in the general population. Fifty-eight percent of the population and 59 percent of those given any type of service were Negro. However, among the 511 clients who were given health supervision, the proportion of whites was slightly larger than that of Negroes. The proportions were 52 and 48, respectively. From these data it is apparent that there was a tendency for the nurses to give to the whites more educational advice and to the Negroes services of a specific nature (communicable disease, tuberculosis, or maternity service). Such a tendency may indicate that the Negroes have a greater need for specific services than for education. However, it is more likely that it indicates an attitude on the part of the nurses concerning the readiness with which the two groups respond to general health instruction.

So far as economic status was concerned, the individuals receiving health supervision were similar to all other recipients of health-department service. They were chiefly selected from the lower economic groups.

TABLE 3.—*Percentage distribution of the total population,*[1] *of all individuals served by the nurses, and of those served for health supervision according to economic status*

Economic status	Percentage of individuals		
	Total population [1]	Served by nurses for any purpose	Served for health supervision
Total	100.0	100.0	100.0
Comfortable	8.0	6.4	5.3
Moderately comfortable	42.0	21.9	19.8
Poor	37.9	39.6	37.3
Very poor	12.1	32.1	37.6

[1] According to random sample.

The health supervision cases were centered in the infant and adult age groups (table 4). Approximately one-third of the cases were infants and another third were adults; the remaining third were divided between the preschool and school groups. The large proportion of cases in the adult group is chiefly due to the fact that the health supervision cases consisted not only of well persons who received health education and advice but also of persons who were sick at the time of the nurses' first visit. Since 90 percent of the illness attended by the nurses was chronic, the service rendered consisted of securing medical care for the patients and in instructing them in health and food habits. When the ill cases were separated from those having no sickness at the time of the nurse's first contact, the age distribution of the two groups showed a markedly contrasting picture. More infants received the strictly supervisory service of well persons, while the adults constituted the largest group who received service initiated because of an illness. This age distribution corresponds with the division usually found in the health supervisory service, for the care of the well baby is one of the major activities of a nursing program.

TABLE 4.—*Number and percentage of individuals given health supervision service according to age group and condition at time of first contact*

Age groups	Condition at time of first contact					
	Number of individuals			Percentage of individuals		
	Total	Individuals who were well	Individuals who were ill	Total	Individuals who were well	Individuals who were ill
Total	511	321	190	100.0	100.0	100.0
Infant	165	156	9	32.3	48.6	4.7
Preschool	112	98	14	21.9	30.5	7.4
School	55	45	10	10.8	14.0	5.3
Adult	179	22	157	35.0	6.9	82.6

In addition to a description of the clientele to whom the nursing staff rendered health supervision, the records also permitted an analysis of the channels through which the cases first came to the attention of the nurses. As would be expected, voluntary requests either from the patient himself or from a friend or relative were the primary source of the nurses' knowledge concerning clients who were ill (table 5). On the other hand, over half of the well clients were given service when the nurse made a visit to some other member of the family. This was especially true of the infant group. Out of the total of 156 well infants given health supervision, 109 were found as a result of visits to other members of the family. Approximately one-third of the well individuals who were served by the nurses had either re-

quested the service themselves or through the efforts of their friends or relatives had sought nursing service. It is a tribute to the nurses that these members of the community recognized the value of the nurses' advice even when there was no immediate health problem.

TABLE 5.—*Number and percentage of individuals rendered health supervision service according to source of first information and condition at time of first contact*

Source of first information	Condition at time of first contact					
	Number of individuals			Percentage of individuals		
	Total	Individuals who were well	Individuals who were ill	Total	Individuals who were well	Individuals who were ill
Total	[1] 510	321	[1] 189	100.0	100.0	100.0
Relative or neighbor	146	83	63	28.6	25 8	33.3
Patient	66	18	48	13 0	5.6	25.4
Visit to other member of family	201	171	30	39.4	53.3	15.9
Physician	21	8	13	4 1	2.5	6.9
Midwife or practical nurse	15	7	8	2 9	2.2	4.2
Health officer	7	7		1.4	2.2	
Other public official	54	27	27	10.6	8.4	14.3

[1] Source of information unknown for 1 individual.

TYPES OF HEALTH SUPERVISION SERVICE

Since health needs vary for each age group, the actual services rendered by the nurses would be expected to differ for each age classification. Accordingly, a description of the service rendered by the nurses is given for each of four age groups—infants, preschool children, school children, and adults.

Service to infants.—The nursing activities for infant health supervision consisted of (*a*) instruction in infant care through mothers' clubs and home nursing classes, (*b*) individual conferences with mothers and their babies at the office, and (*c*) visits made to the home by the nurses. In one or more of these ways the nurses reached 165, or approximately 10 percent, of the infants in the two counties.[3] Although this was a small proportion of the total number of infants, it represented the largest proportion of any single age group that was served by the nurses.

Probably in terms of the nurse's time, the most economical method for giving health supervision to children is through the organization of groups into mothers' clubs. This procedure was used to a limited degree in the two counties. Seven clubs were organized during the year with an average attendance of 24. Usually these clubs were conducted by a local leader with lessons prepared and furnished by the State department of health. It was therefore unnecessary for

[3] It is estimated that the infant population at the beginning of the study plus the live births occurring during the remainder of the year approximated 1,700 for the 2 counties.

the nurses to attend every meeting. However, they did attend 21 such gatherings. Following these meetings, the nurses held many individual conferences with mothers concerning their infants. No record was kept of these conferences, although they were often as valuable as a home visit and took less of the nurses' time.

A second method of giving health supervision that conserves the time of the nurse is a visit to her office by the mother. However, very few contacts were made in this way. Only 13 mothers saw the nurses in their offices, and only 4 of these visited the nurse more than once. The total number of contacts through this method was 24. From such limited use of the office visit, it would seem that the nurses did not encourage this type of contact.

TABLE 6.—*Number and percentage of infants rendered health supervision service and the number and percentage of visits according to place of service*

Number of times served	Infants served				Number of visits	
	Number		Percent			
	Home	Office	Home	Office	Home	Office
Total	[1] 164	13	100 0	100 0	251	24
1	111	9	67 7	69.2	111	9
2	29	2	17.7	15.4	58	4
3	17	1	10.4	7.7	51	3
4 or more	7	1	4.2	7.7	31	8

[1] Number of visits unknown for 1 infant.

The most usual method followed by nurses in advising mothers about the health of their babies was through home visits. In this way 164 infants were seen, and a total of 251 visits was made to these cases for health supervision. Although there was an average of 1.5 visits per infant, less than one-third of the infants received more than one visit (table 6), and only 4 percent received as many as 4 visits, the standard advanced by the Committee of Administrative Practice of the American Public Health Association.[3] Thus, it is apparent that the health supervision of infants in these counties was not a continuous service. Advice was given on one occasion with little or no follow-up to determine the effectiveness of the first instruction. On the other hand, a commendable service was rendered in regard to the early visitation of the infant. Twenty-three percent were visited during their first week of life, and 53 percent were visited during their first month of life. This high percentage of early visitation was in accord with good practice since infant mortality is greatest during the earliest period of a baby's life.

[3] The Appraisal Form for Rural Health Work, American Public Health Association, p. 65.

The supervision activities of the nurses relative to infants were largely confined to advice on infant feeding given the mother, inquiry regarding the birth registration of the child, and the distribution of literature on infant care and feeding (table 7). That there was need for advice on feeding is indicated by the material gathered during the survey of the 1,009 representative families. In that sample only 32 percent of the infants 3 months of age and older were receiving orange or tomato juice regularly, and practically all of these were in the better economic status groups which were very infrequently served by the nurses. Besides furnishing an inadequate supply of vitamins, the diet of the infants still left much to be desired. Only 43 percent of the babies received cereal regularly. Some of the 3-month old babies were given "biscuits and grease" and little "tastes" of the mother's food.

TABLE 7.—*Number and percentage of infants rendered health supervision service according to type of advice or service given*

Type of advice or service given	Infants given health supervision service	
	Number	Percentage
Total	[1] 165	[1] 100.0
Advice regarding feeding	161	97.6
Advice regarding birth registration	146	88.5
Distribution of health literature	97	58.8
Advice regarding hygiene	30	18.2
Advice regarding medical examination	26	15.8
Advice regarding diphtheria immunization	17	10.3
Advice regarding correction of defects	17	10.3
Demonstration of preparation of feeding formula	6	3.6
Administration of diphtheria immunization	4	2.4

[1] More than 1 type of service was rendered to some of the infants during the study year

The small number of mothers who were advised regarding the necessity for diphtheria immunization and the fact that smallpox vaccinations for infants never were recommended indicate that, in this very young age group, little emphasis was placed on preventive measures for these two diseases.

Services to preschool children.—Health supervision of the preschool child was very limited during the study year in that only 98, or about 2 percent, of the 4,500 children were given any service of this nature. A visit to the home was the most usual method of reaching the preschool children, although 27 were also seen at preschool clinics. The clinics were conducted by the local physicians, in their offices, with the assistance of the nurses. The actual contacts with the children were extremely infrequent, in fact only one-fourth of the cases were seen more than once by the nurses.

TABLE 8.—*Number and percentage of preschool children rendered health supervision service according to type of advice or service given*

Type of advice or service given	Preschool children served		Type of advice or service given	Preschool children served	
	Number	Percentage		Number	Percentage
Total	[1] 112	[1] 100.0	Diphtheria immunization given	16	14.3
			Typhoid immunization given	6	5.4
Correction of defects urged	52	46.4	Hospitalization arranged	3	2.7
Medical examination advised	49	43.7	Birth registration discussed	2	1.8
Diphtheria immunization advised	30	26.8	Dental examination advised	1	.9
Correction of diet advised	29	25.9	Typhoid immunization advised	1	.9
Establishment of health habits urged	33	29.5	Smallpox vaccination advised	1	.9

[1] More than 1 type of service was rendered to some of the preschool children during the study year.

The services rendered to the preschool children were much more diverse than those given the infants (table 8). Urging the use of medical service either for the correction of defects or for the examination of the children was the most frequent service rendered. Prevention of diphtheria through immunizations was stressed more for this age group than for the infants, but the protection of these children from typhoid fever and smallpox was given very scant attention.

Services to school children.—Health supervision of the school child is the combined responsibility of the teacher, the private physician, and the health department in Virginia counties. Under authority of the West Law, the teachers annually inspect all pupils for physical defects and send a report of their findings to the parents. If medical treatment is necessary they are urged to visit their family physician. The teachers frequently refer to the health officer or to the public health nurse those pupils for whom they desire help or advice.

The nurses' health supervision program for school children consisted of school and home visits. School visits were made for the purposes of taking care of the special health problems found through the teachers' inspections, assisting the health officer in medical examinations and immunizations and helping in the control of communicable disease. In all, 79 such visits were made to the schools. During these visits 1,800 or about one-fifth of the 9,400 school children were inspected. In addition 200 pupils were examined by the health officer, assisted by the nurse. Whether the children inspected by the nurse and examined by the physician were chosen in a routine way or were previously selected by the teacher for additional attention was not indicated on the records.

In view of the service rendered to children of school age, in the school, very few home visits were made. Actually only 45 children were visited. The urging of some type of medical aid was the primary service rendered at the time of these visits (table 9). If the nurses' records present an accurate picture of the service rendered, it would

seem that the content of the visits was extremely limited in scope, for only a quarter of the cases were advised concerning hygienic habits.

TABLE 9.—*Number and percentage of school children rendered health supervision service according to the type of advice or service given*

Type of advice or service given	School children given health supervision		Type of advice or service given	School children given health supervision	
	Number	Percentage		Number	Percentage
Total	[1] 55	[1] 100 0	Correction of diet advised	12	21 8
Correction of defects urged	42	76. 4	Diphtheria immunization given	3	5 4
Medical examination advised	38	69 1	Diphtheria immunization advised	2	3 6
Establishment of health habits urged	14	25 4	Smallpox vaccination given	1	1 8
			Smallpox vaccination advised	1	1 8
			Typhoid immunization advised	1	1. 8

[1] More than 1 type of service was rendered to some of the school children during the study year.

Service to adults.—As previously mentioned, most of the health supervision of adults was initiated because of an illness, and the nurse visited the home to give advice regarding care of the patient. This very probably accounts for the fact that, of the four age groups, the most intensive service was given to adults. Each of the adult cases received an average of 2.0 visits, which was considerably higher than was the average for any other group.

Since about 90 percent of the adult health supervision cases were first seen because of chronic illness, it is to be expected that the service most frequently rendered was to advise a medical examination. Likewise, advice and occasional demonstrations on the care of the patient were necessarily included in this modified type of morbidity service (table 10). However, in giving such advice, the nurse did not overlook the opportunity to teach personal hygiene, as shown by the fact that 65 percent of the cases were given general health instruction. In addition the nurses gave specific dietetic advice to the pellagra patients and explained to them the nature and cause of the disease. Yeast was furnished to those who could not afford to purchase it. The other services rendered were of a miscellaneous character, affecting very few individuals.

TABLE 10.—*Number and percentage of adults rendered health supervision service according to the type of advice or service given*

Type of advice or service given	Adults given health supervision		Type of advice or service given	Adults given health supervision	
	Number	Percentage		Number	Percentage
Total	[1] 190	[1] 100 0	Correction of defects urged	38	20. 0
Medical examination advised	166	87. 4	Health literature given	24	12. 6
Hygienic habits advised	124	65. 3	Balanced diet advised	20	10. 5
Yeast for pellagra given	75	39. 5	Hospitalization arranged	14	7. 4
Care of chronic condition demonstrated or advised	55	28. 9	Dental examination advised	1	0. 5
			Diphtheria immunization advised	1	0. 5

[1] More than 1 type of service was rendered to some of the adults during the study year.

SUMMARY

Health supervision, in the form of instruction in routine health habits of diet, rest, sleep, and in urging the use of medical service, was given to approximately 1.5 percent of the total population of the Brunswick-Greensville area during the study year. This represented about one-half of the total clientele visited by the nurses. In addition, about 1,800 school children were given physical inspections either for defects or for communicable disease.

The service might be characterized as primarily a discontinuous service of one visit. Only one-third were visited more than once, and the proportion who were visited as often as quarterly during the study year was less than 5 percent.

The clientele to whom the nurses gave advice on hygiene were principally in the lower economic groups, with the proportion of whites slightly exceeding the percentage of Negroes. One-third of the individuals served were infants and one-third were adults. The remaining third were preschool and school children. Most of the adults were first seen because of chronic illness, and the nurse visited to give advice in regard to medical care.

The content of the health supervisory visits was extremely limited. The services rendered during such visits varied according to age of the individual served. For the babies, the primary service was advice to the mothers on infant feeding and inquiry concerning birth registration. For the preschool and school children, the urging of medical service either for an examination or for the correction of physical defects was the major service rendered. Not more than one-third of the children in any age group given health supervision received advice on general hygiene and health habit formation. Likewise an important function of public health, namely disease prevention, was given scant attention on these visits. Fourteen percent was the highest proportion of any child age group advised regarding the prevention of those diseases for which immunization procedures are usually urged.

The service rendered adults was principally a type of morbidity care, though it did not include the usual bedside care. It consisted of an advisory service primarily for chronically ill individuals and included also a few demonstrations in the methods of care for such patients.

DISCUSSION

The extremely small number of individuals given any health supervisory service and the lack of continuity and follow-up visits constitute a serious weakness in this phase of the health program. It is more than likely that other county programs of health super-

vision are similarly restricted in volume and intensity. However, this limitation is not easily remedied, because of the large number of individuals needing advice on problems of hygiene and the relatively small amount of nursing time. Whether it is better to make one contact with a large number of individuals or to render a continuous intensive service to a relatively few persons is an unsolved problem confronting all public health nurses in rural areas. It may be that the practical solution lies in a greater amount of group instruction using the techniques and facilities for adult education rather than extending the individual method of teaching.

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DEATHS DURING WEEK ENDED NOVEMBER 13, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov. 13, 1937	Corresponding week, 1936
Data from 86 large cities in the United States:		
Total deaths	8,121	8,134
Average for 3 prior years	8,001	
Total deaths, first 45 weeks of year	386,514	386,672
Deaths under 1 year of age	513	553
Average for 3 prior years	541	
Deaths under 1 year of age, first 45 weeks of year	24,815	25,078
Data from industrial insurance companies:		
Policies in force	69,931,141	68,609,080
Number of death claims	11,069	11,369
Death claims per 1,000 policies in force, annual rate	8.3	8.7
Death claims per 1,000 policies, first 45 weeks of year, annual rate	9.7	9.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers.

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (------) indicate that cases or deaths may have occurred although none was reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 20, 1937, and Nov. 21, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov 20, 1937	Week ended Nov 21, 1936	Week ended Nov 20, 1937	Week ended Nov 21, 1936	Week ended Nov 20, 1937	Week ended Nov 21, 1936	Week ended Nov 20, 1937	Week ended Nov 21, 1936
New England States:								
Maine	1	3	1	------	28	26	0	0
New Hampshire	2	------	------	------	42	4	0	0
Vermont	2	1	------	------	44	3	0	0
Massachusetts	5	6	------	------	82	75	3	2
Rhode Island	------	------	------	------	2	65	0	0
Connecticut	8	6	4	4	5	75	1	0
Middle Atlantic States:								
New York	25	29	[1] 11	[1] 13	111	104	3	8
New Jersey	17	11	7	17	262	28	1	0
Pennsylvania	33	30	------	------	1, 032	50	2	8
East North Central States:								
Ohio	46	51	6	6	119	6	4	4
Indiana	32	49	23	13	16	7	0	3
Illinois	44	37	10	12	368	7	4	7
Michigan	36	32	1	1	78	31	2	2
Wisconsin	2	7	33	23	58	40	0	1
West North Central States:								
Minnesota	13	24	1	------	3	17	2	0
Iowa	2	3	------	3	5	1	2	3
Missouri	55	28	41	46	583	3	1	2
North Dakota	1	1	------	9	5	4	0	0
South Dakota	2	1	------	------	------	2	0	0
Nebraska	1	2	------	------	2	3	2	1
Kansas	14	17	1	1	19	4	0	1
South Atlantic States:								
Delaware	------	------	------	------	------	12	0	0
Maryland [3]	41	11	5	7	3	42	0	9
District of Columbia	5	8	------	------	5	3	3	0
Virginia	31	92	------	------	73	23	3	4
West Virginia	31	22	21	20	47	------	4	2
North Carolina [3]	80	100	2	9	222	18	2	1
South Carolina [3]	12	19	214	324	10	6	1	0
Georgia [3]	23	55	------	------	------	------	1	2
Florida [3]	15	7	5	4	55	1	1	0
East South Central States:								
Kentucky	25	27	4	16	62	11	5	6
Tennessee	40	45	47	40	95	1	9	6
Alabama [3]	23	44	116	40	6	2	6	2
Mississippi [3]	13	25	------	------	------	------	2	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 20, 1937, and Nov. 21, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 20, 1937	Week ended Nov. 21, 1936	Week ended Nov. 20, 1937	Week ended Nov. 21, 1936	Week ended Nov. 20, 1937	Week ended Nov. 21, 1936	Week ended Nov. 20, 1937	Week ended Nov. 21, 1936
West South Central States:								
Arkansas	21	6	28	23	8		0	0
Louisiana [3]	27	27	3	24		1	1	1
Oklahoma [4]	34	7	16	61	4	3	1	0
Texas [3]	61	45	237	88	44	9	1	1
Mountain States:								
Montana	2	2		1	23	1	1	1
Idaho	4		5	5	31	73	0	1
Wyoming						2	0	0
Colorado	7	1			24	4	0	2
New Mexico	6	7	2	3	40	24	0	0
Arizona	13	1	41	22	1	18	0	0
Utah [2]	54	1			17	17	0	3
Pacific States:								
Washington	2			1	30	10	0	3
Oregon	8		27	37	16	5	0	0
California [3]	51	57	34	45	47	34	1	7
Total	980	947	945	913	3,730	875	69	94
First 46 weeks of year	23,718	24,196	282,053	117,002	260,293	273,796	4,930	6,733

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Nov. 20, 1937	Week ended Nov. 21, 1936	Week ended Nov. 20, 1937	Week ended Nov. 21, 1936	Week ended Nov. 20, 1937	Week ended Nov. 21, 1936	Week ended Nov. 20, 1937	Week ended Nov. 21, 1936	Week ended Nov. 20, 1937
New England States:									
Maine	0	1	30	11	0	0	1	1	34
New Hampshire	0	0	12	2	0	0	0	0	7
Vermont	0	1	15	6	0	0	2	1	7
Massachusetts	3	1	126	105	0	0	2	1	130
Rhode Island	1	0	31	23	0	0	1	0	53
Connecticut	0	2	61	35	0	0	2	8	60
Middle Atlantic States:									
New York	7	4	348	334	0	0	8	8	392
New Jersey	2	0	85	51	0	0	4	2	98
Pennsylvania	0	4	340	391	0	0	19	21	
East North Central States:									
Ohio	0	9	225	242	3	0	3	5	106
Indiana	1	0	139	124	21	2	4	3	22
Illinois	4	9	355	306	6	1	13	11	93
Michigan	5	2	417	291	4	1	4	3	164
Wisconsin	1	0	181	225	2	14	1	1	170
West North Central States:									
Minnesota	2	2	135	145	8	5	2	0	43
Iowa	4	3	175	80	24	2	0	3	80
Missouri	4	4	176	74	4	4	5	13	63
North Dakota	0	1	43	35	32	16	0	0	34
South Dakota	1	2	34	36	2	6	1	0	34
Nebraska	3	2	35	27	1	0	2	6	12
Kansas	2	2	118	231	2	10	1	8	70
South Atlantic States:									
Delaware	0	0	12	5	0	0	2	0	6
Maryland [2]	1	0	90	62	0	0	5	10	100
District of Columbia	0	0	19	12	0	0	0	1	5
Virginia	0	0	45	75	0	0	4	13	66
West Virginia	0	0	102	77	0	0	11	14	40
North Carolina [3]	0	0	66	105	0	0	2	10	152
South Carolina [3]	0	1	12	11	0	0	2	10	28
Georgia [3]	1	6	82	34	0	0	5	12	16
Florida [3]	3	2		3	1	0	1	0	8

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 20, 1937, and Nov. 21, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Nov. 20, 1937	Week ended Nov. 21, 1936	Week ended Nov 20, 1937	Week ended Nov. 21, 1936	Week ended Nov. 20, 1937	Week ended Nov. 21, 1936	Week ended Nov. 20, 1937	Week ended Nov. 21, 1936	Week ended Nov. 20, 1937
East South Central States:									
Kentucky	0	5	69	68	5	0	9	14	93
Tennessee	0	6	64	70	6	0	4	11	45
Alabama [3]	3	4	20	28	0	0	5	3	12
Mississippi [2]	7	2	12	23	2	0	4	3	-------
West South Central States:									
Arkansas	3	5	20	5	9	0	22	4	18
Louisiana [3]	1	1	21	17	3	0	13	15	6
Oklahoma [4]	1	17	59	21	2	0	10	19	28
Texas [3]	2	1	113	42	2	2	46	20	136
Mountain States:									
Montana	0	0	32	69	17	23	2	0	23
Idaho	0	0	21	31	13	1	2	3	22
Wyoming	0	0	11	9	13	2	0	0	7
Colorado	4	2	32	39	3	3	0	2	7
New Mexico	0	1	30	27	0	1	10	4	74
Arizona	0	1	5	14	0	0	.	3	-------
Utah [2]	1	0	65	17	0	0	0	0	16
Pacific States:									
Washington	2	0	39	59	10	2	1	2	81
Oregon	4	0	24	27	17	13	0	4	32
California [3]	12	11	180	255	3	1	6	7	245
Total	85	114	4,276	3,979	215	109	242	263	2,888
First 46 weeks of year	9,187	4,169	195,700	206,377	9,316	6,525	14,121	13,510	-------

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Nov. 20, 1937, 49 cases, as follows: North Carolina, 2; South Carolina, 4; Georgia, 22; Florida, 1; Alabama, 9; Louisiana, 3; Texas, 5; California, 3
[4] Figures for 1936 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October 1937										
California	8	129	80	22	122	7	85	611	26	43
Florida	7	98	10	132	23	-------	3	21	0	9
Illinois	14	144	38	27	409	1	93	868	7	73
Maine	2	5	3	-------	61	-------	35	36	0	22
Maryland	9	39	33	1	12	-------	6	154	0	25
Massachusetts	6	4	-------	1	89	-------	20	372	0	11
Minnesota	1	75	4	-------	18	-------	69	291	10	10
Mississippi	1	73	2,232	4,351	110	242	34	64	-------	46
Nebraska	3	12	-------	-------	9	-------	49	35	0	2
Nevada	-------	-------	4	-------	2	-------	1	15	0	0
New York	34	86	-------	17	394	-------	110	728	0	80
Ohio	19	225	40	2	818	-------	33	1,025	4	69
Oklahoma	3	145	100	235	14	13	26	231	21	104
Oregon	1	6	68	5	39	-------	11	72	18	9
Texas	7	221	772	1,527	81	126	92	276	3	212
Vermont	-------	9	-------	-------	48	-------	1	15	0	12
Virginia	12	276	348	20	118	9	6	212	-------	42
West Virginia	9	202	50	-------	106	1	7	452	1	49

Summary of monthly reports from States—Continued

October 1937

	Cases
Anthrax:	
Texas	1
Beriberi:	
California	1
Botulism:	
California	1
Chicken pox:	
California	685
Florida	12
Illinois	516
Maine	171
Maryland	117
Massachusetts	291
Minnesota	336
Mississippi	177
Nebraska	17
Nevada	19
New York	624
Ohio	681
Oklahoma	18
Oregon	162
Texas	78
Vermont	85
Virginia	86
West Virginia	99
Dengue:	
Texas	12
Diarrhea:	
Maryland	85
Ohio (under 2 years; enteritis included)	34
Dysentery:	
California (amoebic)	11
California (bacillary)	51
Florida	1
Illinois (amoebic)	8
Illinois (bacillary)	86
Illinois (amoebic carriers)	10
Maryland (bacillary)	23
Massachusetts (bacillary)	4
Minnesota (amoebic)	2
Minnesota (bacillary)	1
Mississippi (amoebic)	67
Mississippi (bacillary)	288
New York (amoebic)	7
New York (bacillary)	211
Ohio (amoebic)	1
Ohio (bacillary)	2
Oklahoma	28
Oregon (amoebic)	9
Oregon (bacillary)	2
Texas (amoebic)	4
Texas (bacillary)	206
Virginia (amoebic)	1
Virginia (diarrhea included)	107
Encephalitis, epidemic or lethargic:	
California	10
Illinois	15
Maryland	3
Massachusetts	1
Minnesota	1
Nebraska	5
New York	8
Ohio	1
Oregon	1
Texas	7
West Virginia	1
Food poisoning:	
California	97
German measles:	
California	58
Illinois	34
Maine	6
Maryland	4
Massachusetts	24
New York	57
Ohio	5
Granuloma (coccidioidal):	
California	4
Hookworm:	
California	1
Florida	1,171
Mississippi	564
Impetigo contagiosa:	
Maryland	42
Oklahoma	6
Oregon	156
Jaundice, epidemic:	
California	4
Oregon	12
Lead poisoning:	
Massachusetts	2
Ohio	22
Leprosy:	
California	1
Mumps:	
California	615
Florida	15
Illinois	191
Maine	59
Maryland	24
Massachusetts	154
Mississippi	110
Nevada	8
Ohio	89
Oklahoma	1
Oregon	46
Texas	81
Vermont	269
Virginia	30
West Virginia	12
Ophthalmia neonatorum:	
California	6
Florida	1
Illinois	5
Massachusetts	89
Mississippi	7
New York [1]	4
Ohio	87
Oklahoma	1
Virginia	1
Paratyphoid fever:	
California	2
Florida	3
Illinois	2
Maryland	1
Massachusetts	1
New York	16
Ohio	1
Texas	10
Virginia	2
Puerperal septicemia:	
Mississippi	44
Ohio	2
Rabies in animals:	
California	162
Florida	2
Illinois	18
Massachusetts	18
Mississippi	15
New York [1]	3
West Virginia	6
Rabies in man:	
California	1
Mississippi	1
Relapsing fever:	
California	4
Scabies:	
Oklahoma	3
Oregon	141
Septic sore throat:	
California	7
Illinois	2
Maryland	5
Massachusetts	15
Minnesota	6
New York	54
Ohio	37
Septic sore throat—Contd.	
Oklahoma	53
Oregon	6
Virginia	26
West Virginia	5
Tetanus:	
California	4
Illinois	2
Massachusetts	2
Minnesota	1
New York	6
Oklahoma	1
Trachoma:	
California	35
Florida	1
Illinois	9
Mississippi	5
Oklahoma	29
Trichinosis:	
California	32
Florida	1
Massachusetts	3
New York	15
Ohio	1
Tularaemia:	
California	2
Minnesota	1
Nevada	3
Ohio	1
Oregon	1
Texas	7
Typhus fever:	
California	2
Florida	7
Maryland	1
Mississippi	2
New York	1
Texas	48
Undulant fever:	
California	23
Florida	4
Illinois	14
Maine	5
Maryland	4
Massachusetts	9
Minnesota	3
Mississippi	2
New York	13
Ohio	6
Oklahoma	65
Oregon	3
Texas	43
Vermont	5
Virginia	1
Vincent's infection:	
Florida	59
Maine	27
Maryland	8
New York [1]	70
Oklahoma	10
Oregon	21
Whooping cough:	
California	856
Florida	23
Illinois	380
Maine	80
Maryland	263
Massachusetts	420
Minnesota	209
Mississippi	270
Nebraska	27
Nevada	3
New York	1,199
Ohio	460
Oklahoma	162
Oregon	75
Texas	354
Vermont	67
Virginia	208
West Virginia	145

[1] Exclusive of New York City

PLAGUE INFECTION IN FRESNO COUNTY, CALIF.

Under date of November 16, 1937, Dr. W. M. Dickie, Director of Public Health of California, reported that plague infection had been proved by animal inoculation in a lot of 48 golden mantled ground squirrels received at the laboratory on September 29 from the Golden Crest area, Fresno State College property, and Billy Creek Camp area, Huntington Lake, Fresno County, Calif., and in a lot of 6 *beecheyi* squirrels received on the same date from the Huntington Dump and the Huntington Lodge area.

WEEKLY REPORTS FROM CITIES

City reports for week ended Nov. 13, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	321	210	40	380	534	1,114	7	352	44	887	--------
Current week	184	84	44	1,122	501	964	7	287	40	735	--------
Maine											
Portland	0	------	0	0	0	0	0	0	0	13	19
New Hampshire.											
Concord	0	-----	0	8	1	0	0	0	0	0	9
Manchester	1	------	0	0	0	2	0	0	0	0	12
Nashua	0	------	0	0	0	1	0	0	0	0	5
Vermont:											
Barre	0	------	0	87	0	0	0	1	0	0	1
Burlington	0	------	0	1	0	0	0	0	0	3	7
Rutland	0	------	0	0	0	0	0	0	0	4	6
Massachusetts.											
Boston	0	------	0	37	9	42	0	10	2	9	196
Fall River	0	------	0	1	2	1	0	1	0	16	21
Springfield	0	------	0	0	1	9	0	1	0	6	37
Worcester	0	------	0	0	3	1	0	2	0	4	48
Rhode Island:											
Pawtucket	0	------	0	0	0	4		0	0	0	14
Providence	1	------	0	0	1	16	0	1	0	7	59
Connecticut											
Bridgeport	0	------	0	1	0	9	0	1	0	0	33
Hartford	0	------	0	1	1	12	0	0	0	4	40
New Haven	0	------	0	1	0	4	0	1	0	0	22
New York											
Buffalo	0	-----	1	3	6	8	0	6	0	14	131
New York	20	10	5	26	80	70	0	9	7	108	1,315
Rochester	0	1	0	1	5	5	0	1	0	9	53
Syracuse	2	------	0	0	8	26	0	1	0	2	49
New Jersey.											
Camden	1	1	1	0	2	2	0	3	3	2	33
Newark	1	2	1	1	4	10	0	4	1	20	91
Trenton	0	------	0	77	1	1	0	2	0	0	26
Pennsylvania											
Philadelphia	2	3	2	17	26	55	0	13	10	29	445
Pittsburgh	0	------	0	163	15	30	0	3	0	14	155
Reading	0	------	0	1	1	3	0	0	0	0	23
Scranton	1	------	--------	10	-------	1	0	-------	0	1	--------
Ohio											
Cincinnati	11	------	0	0	14	18	0	2	0	8	129
Cleveland	2	8	0	40	16	47	0	10	0	18	198
Columbus	3	1	1	2	5	6	0	4	0	2	88
Toledo	2	------	0	4	7	8	0	2	0	3	66
Indiana:											
Anderson	0	------	0	0	0	6	0	1	0	0	11
Fort Wayne	1	------	0	0	7	2	0	1	0	0	30
Indianapolis	5	------	1	1	8	16	0	4	0	1	107
Muncie	1	------	0	1	2	4	0	1	0	0	17
South Bend	1	------	0	0	2	0	0	0	0	0	20
Terre Haute	2	------	0	0	0	3	0	0	0	1	25

City reports for week ended Nov. 13, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Illinois:											
Alton	0	......	0	28	0	5	0	0	0	0	11
Chicago	19	7	0	117	39	102	0	44	1	31	710
Elgin	0	......	0	0	2	0	0	0	0	4	9
Moline	0	1	0	1	3	12	0	0	0	1	22
Springfield	0	......	0	0	4	5	0	0	0	0	21
Michigan:											
Detroit	13	1	0	45	24	100	0	20	0	45	283
Flint	5	......	0	2	3	18	0	0	0	3	15
Grand Rapids	1	......	0	1	2	19	0	0	0	23	34
Wisconsin:											
Kenosha	0	......	0	0	1	2	0	0	0	2	9
Madison	0	......	0	0	1	1	0	1	0	0	18
Milwaukee	1	1	1	35	7	19	0	6	0	26	118
Racine	0	......	0	0	1	10	0	0	0	1	9
Superior	0	......	0	0	1	3	0	0	0	0	6
Minnesota:											
Duluth	0	......	0	0	1	2	0	1	0	19	26
Minneapolis	0	......	1	0	3	14	0	1	0	12	76
St. Paul	0	......	0	3	3	8	0	5	0	4	67
Iowa:											
Cedar Rapids	0	......	......	0	......	3	0	......	0	1	......
Davenport	1	......	......	0	......	2	0	......	0	0	......
Des Moines	0	......	......	0	......	16	0	......	2	0	32
Sioux City	0	......	......	1	......	2	0	......	0	2	......
Waterloo	0	......	......	0	......	1	0	......	0	0	......
Missouri:											
Kansas City	0	......	1	1	12	9	0	4	0	1	101
St. Joseph	0	......	0	0	3	7	0	0	0	1	16
St. Louis	16	......	0	381	8	48	1	2	0	3	235
North Dakota:											
Fargo	0	......	0	0	1	4	0	0	0	4	5
Grand Forks	0	......	......	0	......	11	0	......	0	0	......
Minot	0	......	0	0	0	0	0	0	0	4	2
South Dakota:											
Aberdeen	6	......	......	0	......	3	0	......	1	0	......
Nebraska:											
Omaha	0	......	0	0	6	1	0	3	0	0	70
Kansas:											
Lawrence	0	......	0	0	0	2	0	0	0	0	3
Topeka	0	......	0	1	0	7	0	0	0	10	10
Wichita	0	......	0	2	2	2	0	1	0	2	27
Delaware:											
Wilmington	0	......	0	0	2	5	0	0	0	2	21
Maryland:											
Baltimore	14	2	2	4	15	17	0	14	0	49	187
Cumberland	0	......	0	0	0	2	0	0	0	9	15
Frederick	0	......	0	0	0	0	0	0	0	0	6
Dist. of Col.:											
Washington	6	......	0	1	10	9	0	6	0	4	145
Virginia:											
Lynchburg	0	......	0	0	2	2	0	0	1	0	6
Norfolk	0	......	0	0	3	4	0	1	0	0	21
Richmond	0	......	1	0	4	6	0	2	1	0	54
Roanoke	3	......	0	0	2	1	0	2	0	0	13
West Virginia:											
Charleston	4	1	1	2	2	1	0	0	0	0	27
Huntington	3	......	......	6	......	4	0	......	0	0	......
Wheeling	0	......	0	1	6	8	0	0	0	21	18
North Carolina:											
Gastonia	0	......	......	0	......	1	0	......	0	1	......
Raleigh	1	......	0	0	2	0	0	0	0	14	8
Wilmington	0	......	0	0	0	0	0	0	0	13	20
Winston-Salem	3	......	0	0	3	7	0	1	0	4	10
South Carolina:											
Charleston	3	6	0	8	5	0	0	0	1	0	37
Florence	2	......	0	0	2	0	0	0	0	0	21
Greenville	0	......	0	0	1	0	0	0	0	4	16
Georgia:											
Atlanta	0	19	1	14	6	17	0	3	3	8	80
Brunswick	0	......	0	0	0	0	0	0	0	0	0
Savannah	2	......	0	1	3	0	0	3	2	0	33
Florida:											
Miami	0	......	0	3	1	1	0	2	0	3	29
Tampa	1	2	2	0	2	1	0	1	0	1	29

City reports for week ended Nov. 13, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Kentucky:											
Ashland	1		0	0	0	0	0	0	0	0	0
Covington	0		0	0	2	2	0	0	0	0	11
Lexington	0		0	0	2	0	0	2	0	0	19
Louisville	1	1	0	4	5	23	0	1	0	8	69
Tennessee:											
Knoxville	1		0	0	3	0	0	2	0	0	31
Memphis	2		1	16	4	7	0	2	2	3	74
Nashville	0		2	1	1	0	0	1	0	2	41
Alabama:											
Birmingham	4	4	1	1	5	2	0	4	0	0	57
Mobile	0		1	0	0	1	0	0	0	0	23
Montgomery	1			0	0	2	0		0	1	
Arkansas:											
Fort Smith	3			0		3	0		0	5	
Little Rock	0		0	1	3	2	0	0	0	0	7
Louisiana:											
New Orleans	5	5	5	0	11	5	0	13	0	0	172
Shreveport	4		0	0	0	4	0	3	1	0	33
Oklahoma:											
Muskogee	0			0		6	0		0	0	
Oklahoma City	2		0	0	3	4	0	2	2	0	51
Tulsa	0			0		5	1		0	17	
Texas:											
Dallas	5	2	2	0	0	13	0	3	0	5	61
Fort Worth	0		1	0	0	9	0	2	1	3	31
Galveston	0		0	0	2	1	0	2	2	0	12
Houston	1		1	0	6	0	0	4	2	0	78
San Antonio	0		1	0	3	3	0	7	1	0	51
Montana:											
Billings	0		0	1	1	0	0	0	0	0	9
Great Falls	0		0	0	0	1	2	0	0	7	7
Helena	0		0	0	0	4	0	0	0	3	6
Missoula	0		0	0	1	0	0	0	0	0	7
Idaho:											
Boise	0		0	0	0	0	1	0	0	0	7
Colorado:											
Colorado Springs	0		0	0	3	2	0	1	0	0	13
Denver	7		2	6	9	11	0	7	0	2	88
Pueblo	0		0	0	0	1	0	0	0	0	3
New Mexico:											
Albuquerque	0		0	6	2	1	0	3	0	1	8
Utah:											
Salt Lake City	1		3	1	3	19	0	0	0	4	38
Washington:											
Seattle	2		0	0	4	4	0	5	0	7	90
Spokane	0		0	3	6	4	0	0	0	2	28
Tacoma	0		0	0	4	2	3	1	0	9	33
Oregon:											
Portland	3	1	0	0	4	6	0	4	2	2	89
Salem	0	1		0		0	0		0	0	
California:											
Los Angeles	7	7	3	2	18	21	0	22	0	32	382
Sacramento	1		0	0	2	0	0	3	0	12	28
San Francisco	1	1	0	3	9	7	0	10	0	48	159

City reports for week ended Nov. 13, 1937—Continued

State and city	Meningococcus meningitis		Polio-myelitis cases
	Cases	Deaths	
Maine:			
Portland	0	0	1
Massachusetts:			
Worcester	1	0	0
New York:			
New York	3	2	2
Pennsylvania:			
Pittsburgh	0	1	0
Ohio:			
Cincinnati	1	1	0
Cleveland	1	0	0
Indiana:			
Indianapolis	0	1	0
Illinois:			
Chicago	2	1	1
Elgin	0	0	1
Michigan:			
Detroit	1	0	0
Wisconsin:			
Milwaukee	0	0	1
Minnesota:			
St. Paul	0	0	1
Missouri:			
Kansas City	2	1	0
St. Joseph	0	1	0
Nebraska:			
Omaha	0	0	1
Maryland:			
Baltimore	3	0	0
Virginia:			
Lynchburg	2	0	0
Richmond	1	0	0
Georgia:			
Atlanta	1	0	0
Florida:			
Tampa	3	0	0
Kentucky:			
Louisville	1	0	0
Louisiana:			
New Orleans	0	0	2
Texas:			
San Antonio	0	0	1
Montana:			
Missoula	0	0	1
Colorado:			
Denver	0	1	0
Pueblo	0	0	1
Washington:			
Seattle	0	0	1
California:			
Los Angeles	0	0	3
Sacramento	2	1	0

Encephalitis, epidemic or lethargic.—Cases: New York, 1; Newark, 1; Minneapolis, 2.
Pellagra.—Cases: Atlanta, 2; Birmingham, 3; Los Angeles, 1.
Typhus fever.—Cases: Norfolk, 2; Savannah, 2.

FOREIGN AND INSULAR

CZECHOSLOVAKIA

Communicable diseases—August 1937.—During the month of August 1937, certain communicable diseases were reported in Czechoslovakia, as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	10		Malaria	530	
Cerebrospinal meningitis	14	4	Paratyphoid fever	48	1
Chicken pox	57		Poliomyelitis	30	3
Diphtheria	1,974	86	Puerperal fever	13	4
Dysentery	480	66	Scarlet fever	1,696	17
Influenza	55	1	Trachoma	38	
Lethargic encephalitis	1	1	Typhoid fever	1,106	68

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for November 26, 1937, pages 1738–1752. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued December 31, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

India (French)—Pondichery Territory.—Cholera has been reported in Pondichery Territory, French India as follows: Week ended September 18, 1937, 1 case, 1 death; week ended October 23, 1937, 1 case.

Plague

Hawaii Territory—Island of Hawaii - Hamakua District—Paauhau Sector.—A rat found on November 9, 1937, in Paauhau Sector, Hamakua District, Island of Hawaii, Hawaii Territory, has been proved plague-infected.

United States—California.—A report of plague in California appears on page 1798 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

Mexico.—During the month of August 1937, smallpox has been reported in Mexico as follows: Mexico, D. F., 9 cases, 1 death; Michoacan State, Morelia, 4 cases; Queretaro State, Queretaro, 1 case.

Typhus Fever

Mexico.—During the month of August 1937, typhus fever has been reported in Mexico as follows: Mexico, D. F., 27 cases, 3 deaths; Pachuca, Hidalgo State, 3 cases, 1 death; Queretaro, Queretaro State, 2 cases, 1 death; Toluca, Mexico State, 38 cases, 2 deaths.

Straits Settlements—Singapore.—During the week ended September 18, 1937, 1 case of typhus fever was reported in Singapore, Straits Settlements.

Yellow Fever

Gold Coast—Mamidede.—On November 2, 1937, 2 suspected cases of yellow fever were reported in Mamidede, Gold Coast.

Nigeria.—Yellow fever has been reported in Nigeria as follows: October 26, 1937, 1 suspected case in Ibadan; October 16, 1937, 1 case in Makurdi followed by death on October 23, 1937.

Senegal Sebikotane.—Yellow fever has been reported in Sebikotane, Senegal, as follows: November 2, 1 case, 1 death; November 3, 2 cases.

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UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst Surg. Gen ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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Librarians and others should preserve their copies for binding, as the Public Health Service is unable to supply the general demand for bound copies. Indexes will be supplied upon request.

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PUBLIC HEALTH REPORTS

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SEASONAL VARIATION IN INTENSITY OF BRAIN REACTION OF THE ST. LOUIS ENCEPHALITIS IN MICE AND OF ENDEMIC TYPHUS IN GUINEA PIGS

By R. D. Lillie, *Surgeon*, R. E. Dyer and C. Armstrong, *Senior Surgeons*, and J. G. Pasternack, *Passed Assistant Surgeon, U. S. Public Health Service*

ENCEPHALITIS IN MICE

During the course of the routine examination of the mouse brains for encephalitis, from the serum neutralization tests reported by Wooley and Armstrong (1934), a disturbing decrease in the frequency

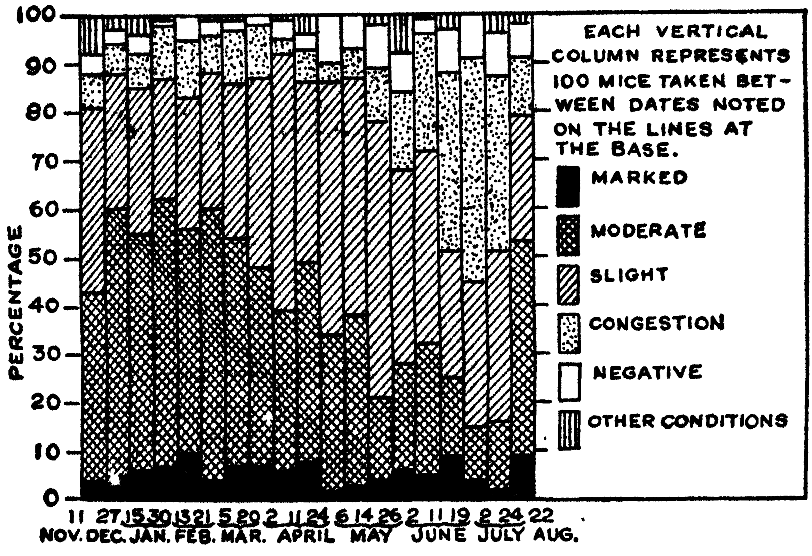

Figure 1.—St. Louis encephalitis. Seasonal variation in intensity of brain reaction in mice.

of positive brain reactions occurred in the summer of 1934, so much so that routine brain examinations were discontinued in September, before the conclusion of the serum neutralization series. When the series of over 1,900 mouse brains examined in this study was segregated according to the intensity of reaction, and frequency of inconclusive or nondiagnostic findings, it first became apparent that the changes occurred in an orderly and progressive fashion, and that

just as the series was concluded a marked increase in frequency of positive reactions recurred.

The examinations of the mouse brains were made on a series of three transverse sections, one through the frontal area of the cerebrum and corpora striata, one through parietal and temporal cortex, hippocampus, and thalamus, and the third through pons and cerebellum. Material was fixed usually in Orth's bichromate formalin solution, a few times in Carnoy's absolute alcohol, chloroform, and acetic acid, and stained routinely with the buffered Romanowsky stain (Lillie

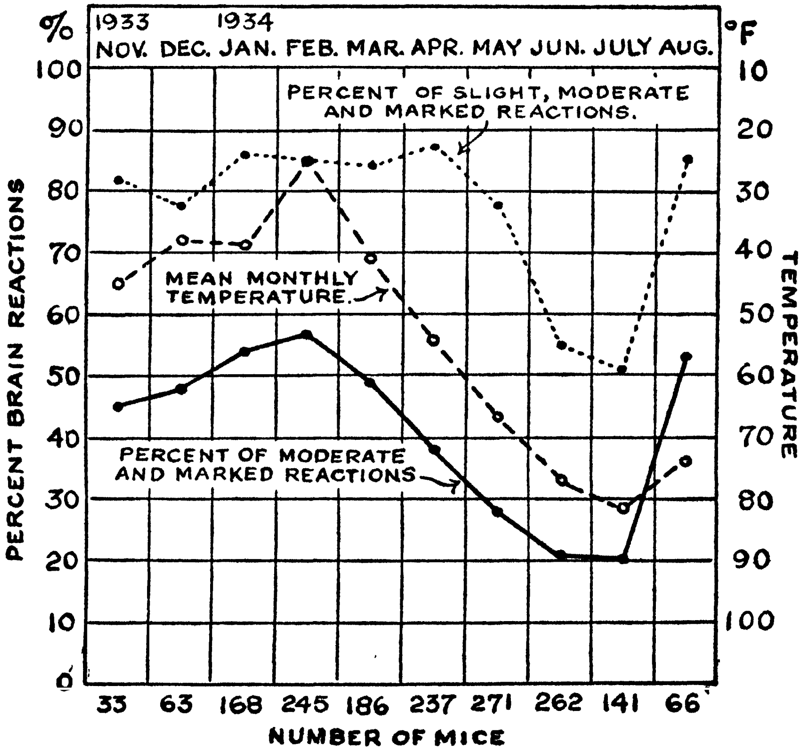

FIGURE 2.—Brain reaction in St. Louis encephalitis in mice and mean monthly temperature (inverted).

and Pasternack, 1932, 1936). The intensity of the reaction was roughly estimated for each area examined, and then the aggregate reaction was graded as marked (++), moderate or average (+), slight (±), congestion only (*C*), or negative (—). About the first 1,300 of these examinations were done by one of us (R. D. L.), the last 600 by another (J. G. P.), and at the transition period about 50 were graded independently by both, to establish uniformity of grading.

Figure 1 and table 1 show the results of these examinations grouped by successive hundreds of mice, with dates between which each hundred came to autopsy. Moderate and marked reactions were seen in 40 to 60 percent of the mice from November to April. There-

after reactions of these grades decreased in frequency to a low of 15 to 16 percent in June and July. In the final hundred moderate and marked reactions rose abruptly to 53 percent. Slight reactions ranged between 25 and 32 percent from December to March, rising to 57 percent in May, dropping again to 25 to 35 percent in June, July, and August. It is more significant that the aggregate of slight, moderate, and marked reactions remains fairly constant between 80 and 90 percent from November 11 to May 14, thereafter falling to a low of 45 percent in the latter part of June, and rising abruptly in August to 78 percent. Negative reactions varied between 1 and 5 percent from November to April, between 3 and 10 percent from May to August. Brains showing appreciable to marked congestion without cellular exudative or proliferative reaction varied between 3 and 11 percent from November to May, rose to 36 to 46 percent in June and July, and decreased to 12 percent in August.

TABLE 1.—*Variation in grade of reaction to St. Louis encephalitis virus in mice by successive hundreds of mice*

	Negative	Congestion	Slight encephalitis	Moderate encephalitis	Marked encephalitis	Lymphocytic choriomeningitis	Lymphocytic meningitis	Pyogenic	Hemorrhage	Total
3,929-4,249 (R. D. L - J G. P.) Nov. 11-Dec. 27, 1933	4	7	38	39	4	0	6	1	1	100
4,250-4,440 (R. D. L.) to Jan. 16, 1934	3	6	28	55	5	0	2	0	1	100
4,441-4,610 (R. D. L.) to Jan. 30, 1934	4	7	30	49	6	1	1	2	0	100
4,611-4,750 (R. D. L.) to Feb. 13, 1934	1	11	25	55	7	1	0	0	0	100
4,751-4,874 (R. D. L.) to Feb. 21, 1934	5	12	27	46	10	0	0	0	0	100
4,875-5,065 (R. D. L.) to Mar. 5, 1934	3	8	28	56	4	0	0	1	0	100
5,066-5,217 (R. D. L.) to Mar. 20, 1934	2	11	32	47	7	1	0	0	0	100
5,218-5,450 (R. D. L.) to Apr. 2, 1934	2	11	39	41	7	0	0	0	0	100
5,451-5,645 (R. D. L.) to Apr. 11, 1934	4	3	53	33	6	0	1	0	0	100
5,646-5,820 (R. D. L.) to Apr. 24, 1934	3	7	37	41	8	1	1	2	0	100
5,821-5,974 (R. D. L.) to May 6, 1934	10	4	52	32	2	0	0	0	0	100
5,975-6,107 (R. D. L.) to May 14, 1934	7	6	49	35	3	0	0	0	0	100
6,108-6,261 (R. D. L.) to May 26, 1934	9	11	57	17	4	1	0	1	0	100
6,262-6,384 (J. G. P.) to June 2, 1934	8	16	40	22	6	0	3	4	1	100
6,385-6,504 (J. G. P.) to June 11, 1934	3	24	40	27	5	0	0	1	0	100
6,505-6,635 (J. G. P.) to June 19, 1934	9	37	26	16	9	0	2	1	0	100
6,636-6,801 (J. G. P.) to July 2, 1934	9	46	30	11	4	0	0	0	0	100
6,802-7,038 (J. G. P.) to July 24, 1934	9	36	35	14	2	0	0	4	0	100
7,039-7,208 (J. G. P.) to Aug. 22, 1934	7	12	26	44	9	0	1	0	1	100
Total	102	275	692	680	108	5	17	17	4	1,900
Aug. 22-23, 1934 (J. G. P.) residue after last 100	0	1	5	5	0	0	0	0	0	11
Grand total	102	276	697	685	108	5	17	17	4	1,911

The explanation of this apparent seasonal variation seemed to be a relation to the prevailing temperatures (fig. 2). However, it seemed possible that a variation in the average virus dosage might be responsible, and so the series of 1,903 mouse brain records was segregated according to approximate dosage into four groups, those receiving about 1 minimum fatal dose of virus or less, those receiving about 10 minimum fatal doses, 100 minimum fatal doses, and those receiving 1,000 or more minimum fatal doses. The dosage was determined individually for each serum virus mixture. During the course of the serum-testing studies of Wooley and Armstrong the virus dosage was kept adjusted so that with a nonprotective serum there would be partial survival of the group of four mice receiving the smallest virus dosage (approximately 1:3,000,000 dilution), and with the highest virus dosage (approximately 1:3,000) some mice would succumb even with a protective serum. Four serial decimal dilutions were used, four mice to each. If half the mice on the highest dilution survived, the dosage of the lowest dilution was called 1,000 minimum fatal doses, of the second 100 minimum fatal doses, of the third 10 minimum fatal doses, and of the highest 1 minimum fatal dose. The minimum fatal dose was always considered to be that dilution in which approximately half the mice died. Naturally, many irregularities occurred, and hence the estimation of dosage is only approximate. Individual mice dying with histologic evidence of encephalitis after a dosage estimated at 0.1 or 0.01 of the average minimum fatal dose were considered to have received 1 minimum fatal dose.

TABLE 2.—*Relation of virus dosage to histologic reactions*

Virus dosage		—	C	±	+	++	Compl.	Total
1 minimum fatal dose	Number	39	122	241	151	21	19	593
	Percent	*6.6*	*20.6*	*40.7*	*25.5*	*3.5*	*3.2*	*100.0*
10 minimum fatal doses	Number	36	96	234	222	27	5	620
	Percent	*5.8*	*15.5*	*37.7*	*35.8*	*4.4*	*0.8*	*100.0*
100 minimum fatal doses	Number	18	52	150	199	35	5	459
	Percent	*3.9*	*11.3*	*32.7*	*43.4*	*7.6*	*1.1*	*100.0*
1,000 minimum fatal doses	Number	5	9	74	116	20	7	231
	Percent	*2.2*	*3.9*	*32.0*	*50.1*	*8.7*	*3.0*	*100.0*
All	Number	98	279	699	688	103	36	1,903
	Percent	*5.1*	*14.7*	*36.7*	*36.1*	*5.4*	*1.9*	*100.0*

— = Negative.
C = Congestion.
± = Slight encephalitis.
+ = Moderate encephalitis.
++ = Marked encephalitis.
Compl. = Complications without recognizable encephalitis.

This dosage segregation shows that the higher virus dosages give materially higher proportions of more marked histologic reactions. However, when the four dosage groups are again segregated by months, the same seasonal variation in distribution of intensity of reactions

becomes apparent. The summer reduction in proportion of strongly positive reactions is less evident with the highest virus dosage, and the fall upturn appears a month sooner, but the number of animals in this group is relatively small, and it is possible that a larger series would give a seasonal curve more closely paralleling the lower dosage groups. As the sum of marked, moderate, and half of the slight

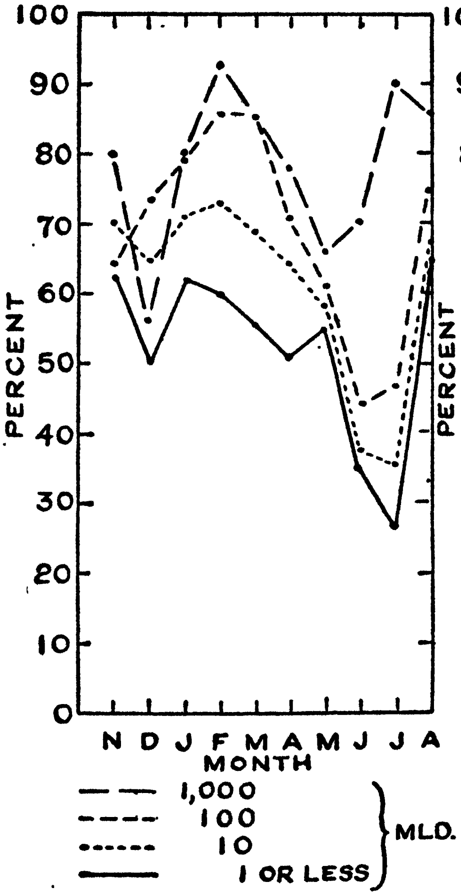

FIGURE 3.—Aggregate percentage of marked and moderate encephalitis and half of slight encephalitis by months, comparing virus dosage—1,000, 100, 10, and 1 or less minimum lethal doses.

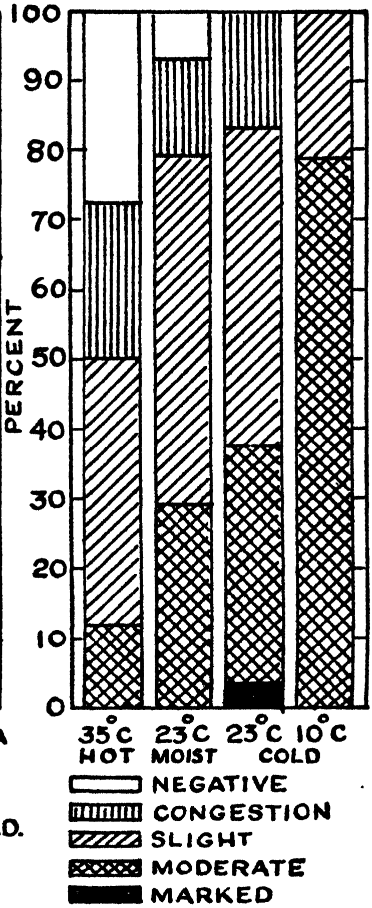

FIGURE 4.—Percentage of slight, moderate, and marked encephalitis and of congestion in experimental series maintained in artificial environment.

reactions represented about one-half of the mice, this value was selected for charting as most nearly representing a median (fig. 3).

The next possible explanation was that a seasonal variation in diet occurred, possibly in the vitamin content of the milk used. Fortunately a series of animals is available in which Armstrong (unpublished experiments) attempted to alter the virus content of the brains by arti-

Table 3.—*Variation in grade of reaction to St. Louis encephalitis virus in mice by virus dosage and by months*

MFD reaction		1 MFD							10 MFD							100 MFD						
		−	C	±	+	++	Comp.	Total	−	C	±	+	++	Comp	Total	−	C	±	+	++	Comp.	Total
1933																						
November	Number	0	0	4	3	0	1	8	0	1	7	8	1	1	18	0	1	3	3	0	0	7
	Percent	*0*	*0*	*50.0*	*37.5*	*0*	*12.5*	*100*	*0*	*5.6*	*38.9*	*44.4*	*5.6*	*5.6*	*100*	*0*	*14.3*	*42.8*	*42.8*	*0*	*0*	*100*
December	Number	2	1	11	5	0	2	21	2	2	5	8	1	0	18	0	4	3	15	1	1	24
	Percent	*9.5*	*4.8*	*52.4*	*23.8*	*0*	*9.5*	*100*	*11.1*	*11.1*	*27.8*	*44.4*	*5.6*	*0*	*100*	*0*	*16.7*	*12.5*	*62.5*	*4.2*	*4.2*	*100*
1934																						
January	Number	2	9	19	24	3	2	59	3	1	25	28	5	1	63	1	3	10	30	1	1	46
	Percent	*3.4*	*15.3*	*32.2*	*40.7*	*5.1*	*3.4*	*100*	*4.8*	*1.6*	*39.7*	*44.4*	*7.9*	*1.6*	*100*	*2.2*	*6.5*	*21.7*	*65.2*	*2.2*	*2.2*	*100*
February	Number	5	16	35	38	7	2	103	2	7	25	42	5	0	81	0	4	9	42	6	0	61
	Percent	*4.9*	*15.5*	*34.0*	*36.9*	*6.8*	*1.9*	*100*	*2.5*	*8.5*	*30.9*	*50.9*	*6.2*	*0*	*100*	*0*	*6.6*	*14.8*	*68.9*	*9.8*	*0*	*100*
March	Number	3	14	31	23	4	1	76	2	7	25	30	4	0	68	1	1	9	26	5	0	42
	Percent	*3.9*	*18.4*	*40.8*	*30.3*	*5.3*	*1.3*	*100*	*2.9*	*10.4*	*36.8*	*44.1*	*5.9*	*0*	*100*	*2.4*	*2.4*	*21.4*	*61.9*	*11.9*	*0*	*100*
April	Number	7	7	40	14	3	1	72	5	5	46	32	6	1	95	2	1	30	32	4	1	70
	Percent	*9.7*	*9.7*	*55.6*	*19.4*	*4.2*	*1.4*	*100*	*5.3*	*5.3*	*48.4*	*33.7*	*6.3*	*1.1*	*100*	*2.9*	*1.4*	*42.9*	*45.7*	*5.7*	*1.4*	*100*
May	Number	12	16	46	21	1	3	99	11	11	44	31	1	1	99	3	3	44	18	5	0	73
	Percent	*12.1*	*16.2*	*46.5*	*21.2*	*1.0*	*3.0*	*100*	*11.1*	*11.1*	*44.5*	*31.3*	*1.0*	*1.0*	*100*	*4.1*	*4.1*	*60.3*	*24.7*	*6.8*	*0*	*100*
June	Number	4	36	32	13	2	3	90	5	37	30	18	2	1	93	5	25	27	15	6	1	79
	Percent	*4.4*	*40.0*	*35.6*	*14.4*	*2.2*	*3.3*	*100*	*5.4*	*39.8*	*32.3*	*19.4*	*2.2*	*1.1*	*100*	*6.3*	*31.6*	*34.2*	*19.0*	*7.6*	*1.3*	*100*
July	Number	3	22	18	4	1	4	52	4	21	18	10	0	0	53	6	9	8	9	4	0	36
	Percent	*5.8*	*42.2*	*34.6*	*7.7*	*1.9*	*7.7*	*100*	*7.5*	*39.6*	*34.0*	*18.9*	*0*	*0*	*100*	*16.7*	*25.0*	*22.2*	*25.0*	*11.1*	*0*	*100*
August	Number	1	1	5	6	0	0	13	2	4	9	15	2	0	32	0	1	7	9	3	1	21
	Percent	*7.7*	*7.7*	*38.5*	*46.2*	*0*	*0*	*100*	*6.2*	*12.5*	*28.1*	*46.9*	*6.2*	*0*	*100*	*0*	*4.8*	*33.3*	*42.8*	*14.3*	*4.8*	*100*
Total	Number	39	122	241	151	21	19	593	36	96	234	222	27	5	620	18	52	150	199	35	5	459
	Percent	*6.6*	*20.6*	*40.7*	*25.5*	*3.5*	*3.2*	*100*	*5.8*	*15.5*	*37.7*	*35.8*	*4.4*	*0.8*	*100*	*3.9*	*11.3*	*32.7*	*43.4*	*7.6*	*1.1*	*100*

MFD reaction		1,000 MFD							All doses						
		−	C	±	+	++	Comp.	Total	−	C	±	+	++	Comp.	Total
1933															
November	Number	0	0	2	8	0	0	10	0	2	16	22	1	2	43
	Percent	*0*	*0*	*20.0*	*80.0*	*0*	*0*	*100*	*0*	*4.7*	*37.2*	*51.2*	*2.3*	*4.7*	*100*
December	Number	2	2	8	10	0	3	25	6	9	27	38	2	6	88
	Percent	*8.0*	*8.0*	*32.0*	*40.0*	*0*	*12.0*	*100*	*6.8*	*10.2*	*30.7*	*43.2*	*2.3*	*6.8*	*100*
1934															
January	Number	0	1	5	8	3	0	17	6	14	59	90	12	4	185
	Percent	*0*	*5.9*	*29.4*	*47.1*	*17.6*	*0*	*100*	*3.2*	*7.6*	*31.9*	*48.6*	*6.5*	*2.2*	*100*
February	Number	0	0	4	22	2	0	28	7	27	73	144	20	2	273
	Percent	*0*	*0*	*14.3*	*78.6*	*7.1*	*0*	*100*	*2.6*	*9.9*	*26.7*	*52.8*	*7.3*	*0.7*	*100*
March	Number	0	0	3	6	1	0	10	6	22	68	85	14	1	196
	Percent	*0*	*0*	*30.0*	*60.0*	*10.0*	*0*	*100*	*3.1*	*11.2*	*34.7*	*43.4*	*7.1*	*0.5*	*100*
April	Number	1	1	12	22	3	1	40	15	14	128	100	16	4	277
	Percent	*2.5*	*2.5*	*30.0*	*55.0*	*7.5*	*2.5*	*100*	*5.4*	*5.1*	*46.2*	*36.1*	*5.8*	*1.4*	*100*
May	Number	2	0	26	18	4	3	53	28	30	160	88	11	7	324
	Percent	*3.8*	*0*	*49.1*	*34.0*	*7.5*	*5.7*	*100*	*8.6*	*9.3*	*49.4*	*27.2*	*3.4*	*2.2*	*100*
June	Number	0	5	10	11	6	0	32	14	103	99	57	16	5	294
	Percent	*0*	*15.6*	*31.2*	*34.3*	*18.8*	*0*	*100*	*4.8*	*35.1*	*33.7*	*19.4*	*5.4*	*1.7*	*100*
July	Number	0	0	1	3	1	0	5	13	52	45	26	6	4	146
	Percent	*0*	*0*	*20.0*	*60.0*	*20.0*	*0*	*100*	*8.9*	*35.6*	*30.8*	*17.8*	*4.1*	*2.7*	*100*
August	Number	0	0	3	8	0	0	11	3	6	24	38	5	1	77
	Percent	*0*	*0*	*27.3*	*72.7*	*0*	*0*	*100*	*3.9*	*7.8*	*31.2*	*49.4*	*6.5*	*1.3*	*100*
Total	Number	5	9	74	116	20	7	231	98	279	699	688	103	36	1,903
	Percent	*2.2*	*3.9*	*32.0*	*50.1*	*8.7*	*3.0*	*100*	*5.1*	*14.7*	*36.7*	*36.1*	*5.4*	*1.9*	*100*

− = Negative. C = Congestion. ± = Slight encephalitis. + = Moderate encephalitis. ++ = Marked encephalitis. Comp. = Complications without encephalitis.

Percentages are in italics, and read laterally.

ficial variation of the environmental temperature. In the course of these experiments, animals on the same diet, simultaneously inoculated with the same materials, were kept in the incubator at a mean daily temperature of 35° C., in the cold at a mean temperature of 10° C., in a moist chamber at room temperature, and under the ordinary room-temperature conditions in a heated building in winter and early spring (mean temperature about 23° C.). The brains of 128 animals were studied, 58 from the high temperature group, 7 part time at 23° C. and part at 35° C., 14 each from the cold and moist groups, and 38 from the control room-temperature group.

The results are presented in table 4. This table shows that animals kept at 35° C. present less marked brain reactions than room temperature (23° C.) controls, while those kept in the cold (10° C.) show more marked reactions (fig. 4).

TABLE 4.—*Effect of temperature and humidity on brain reaction to St. Louis encephalitis virus in mice*

Temperature	No.	–	C	±	+	++	Comp.	Total	Dosage MFD	Remarks
Hot (35° C.)	D 117		1	1	1			3		
	D 133	3	8	3	2			16	1, 5, 50	Compare with D 134, 5, 6.
	D 152	3		8	4			15	1, 5, 30	Compare with D 150, 1.
	D 198	3		2			1	6	1+	See D 198 below.
	D 164	6	4					10	100	See D 164 below.
	D 193			8				8	100+	See D 193 below.
Total		15	13	22	7		1	58		
Percent		*25.9*	*22.4*	*37.9*	*12.1*		*1.7*	*100*		
Moist (23° C.)	D 136	1	2	3	2			8	1, 5, 50	Compare with D 133, 4, 5.
	D 150			4	2			6	30	Compare with D 151,2
Total		1	2	7	4			14		
Percent		*7*	*14*	*50*	*29*			*100*		
Cold (10° C.)	D 134			3	11			14	1, 5, 50	Compare with D 133, 5, 6.
Percent				*21*	*79*			*100*		
Room (23° C.)	D 135		4	6	5			15	1, 5, 50	Compare with D 133, 4, 6.
	D 151		2	3	1	1		7	5–30	Compare with D 150, 2.
	D 193, D 198			1	2			3	1, 5, 30	See D 193, 198, above.
	D 164			6	4			10	100	See D 164 below.
Total		0	6	16	12	1		35		Compare with D 166.
Percent		0	*17.1*	*45.7*	*34.3*	*2.9*		*100*		
23°–35° C. part time, corresponding hundreds in the serum virus test at room temperatures	D 166	1	4	1	1			7	100	Compare with D 164.
	D 133–6	3	8	28	56	4	1	100		
	D150–2	2	11	32	47	7	1	100		
	D164–6	2	11	39	41	7		100		
	D 193	3	7	37	41	8	4	100		
	D 198	7	6	49	35	3		100		
Average		3.4	8.6	37.0	44.0	5.8	1.2	100		

This experiment would appear to indicate that the observed seasonal variation in the distribution of brain reactions of various intensities is a direct environmental temperature effect, as the several

groups were simultaneously inoculated with similar doses and received the same diet.

ENDEMIC TYPHUS IN GUINEA PIGS

These results in the study of the St. Louis encephalitis in mice suggested that possibly a similar effect might be observed in endemic typhus in guinea pigs. Accordingly, the endemic typhus material used in our recent study on typhus and spotted fever (Lillie and Dyer 1936) was arranged according to month of death. This material was accumulated, over a period of several years, from various strains of endemic typhus, and in several months the number of animals was quite small. The guinea pigs killed before the 9th and after the 13th day of fever were excluded, restricting the material used to the peak period of the reaction, 9 to 13 days from onset of fever. Lesions were enumerated, as described in our previous paper (1936), from the same series of 5 standard cross sections from frontal cortex and corpora striata; thalamus, temporal and parietal cortex and hippocampus at the border of the optic radiation; midbrain through oculomotor roots and anterior colliculi; pons and cerebellum through brachia pontis; and enlargement of medulla.

The preliminary grouping by months is shown in table 5. This grouping showed high average numbers of lesions from October to April, and low numbers from May to September.

TABLE 5.—*Average number of focal lesions counted in 5 standard cross sections of the brain of guinea pigs in endemic typhus, by months. Preliminary tabulation*

	Jan	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Number of guinea pigs	11	40	15	4	24	7	2	7	16	8	12	31	177
Aggregate number of lesions	379	1,267	113	119	179	52	2	32	37	138	313	1,098	3,729
Average number of lesions	34.5	31.7	7.5	29 8	7.4	7.4	1.0	4.6	2 3	17.2	25.2	33.8	21.1

Encouraged by the result of this tabulation, but dissatisfied with the small number of animals in some months, we determined to examine at least 30 guinea pig brains each month for a full year. Approximately half of these animals were inoculated and carried through to the 9th to 12th day from febrile onset at the National Institute in Washington, D. C., the others at the branch laboratory in Mobile, Ala., by Dr. George D. Brigham.

During the year from February 1, 1936, to January 31, 1937, 515 guinea pig brains were collected, 226 in Washington and 289 in Mobile. The results of the individual examinations are presented in figure 5, and the median lines for Washington and Mobile are drawn in. A seasonal variation was again shown in both series.

Figures 6 and 7 show a median average monthly number of lesions charted against the mean monthly temperatures for the respective cities. This median average was calculated by excluding the two-sixths of the animals showing, respectively, the highest and lowest numbers of lesions, and averaging the remaining middle two-thirds, in order to exclude the effect on an arithmetic average of the few extraordinarily high counts.

The mean monthly temperatures are naturally outdoor temperatures, and when these fell below 60° to 65° F. the effect of heating of buildings naturally came into effect, so that little difference is shown between the Washington and Mobile series from February to April,

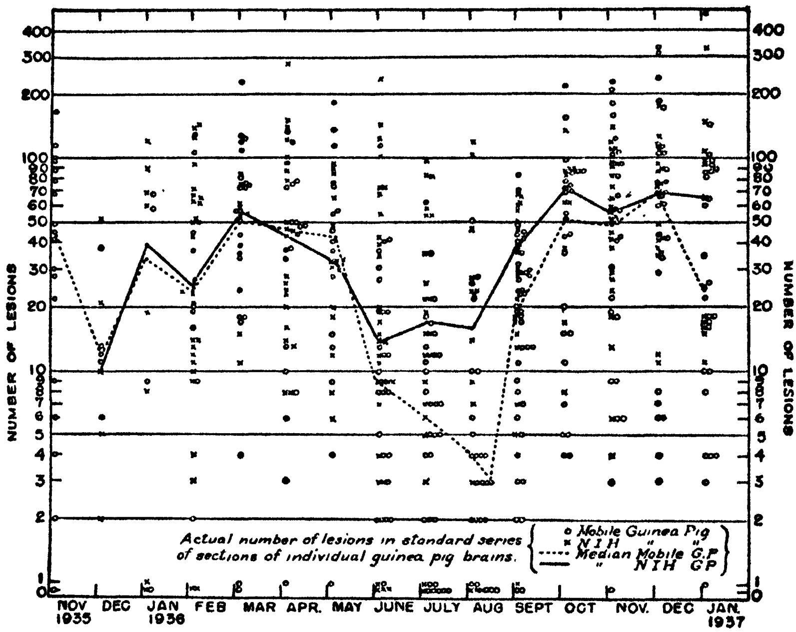

FIGURE 5.—Seasonal variation in the brain reaction of endemic typhus in guinea pigs in Mobile, Ala., and Washington, D. C.

and in November and December 1936. A noteworthy drop in the average number of lesions in the Mobile series in January 1937 was accompanied by a rise of the mean temperature from 54.2° to 63° F. It is to be further noted that the maximum mean temperatures of 73° to 78° F. in Washington were accompanied by lesion averages of 14 to 23, while mean temperatures around 82° F. in Mobile were accompanied by lesion counts averaging 4 to 10.

As in the St. Louis encephalitis in mice, a correlation with temperature appeared to be an important determining factor in the intensity of the endemic typhus reaction in the guinea pig brain.

To test further this hypothesis, three series of guinea pigs were inoculated in January 1937 with the same material at the same time,

and fed identical diets, the one maintained in a room heated to about 33° C., the second series in a room kept about 18° C., and the third at room temperature, about 24° C. The animals were acclimated to the temperatures prevailing in the respective rooms for a period of 3 weeks before inoculation, and kept there until killed on the 11th day from onset of fever. The results are presented in table 6.

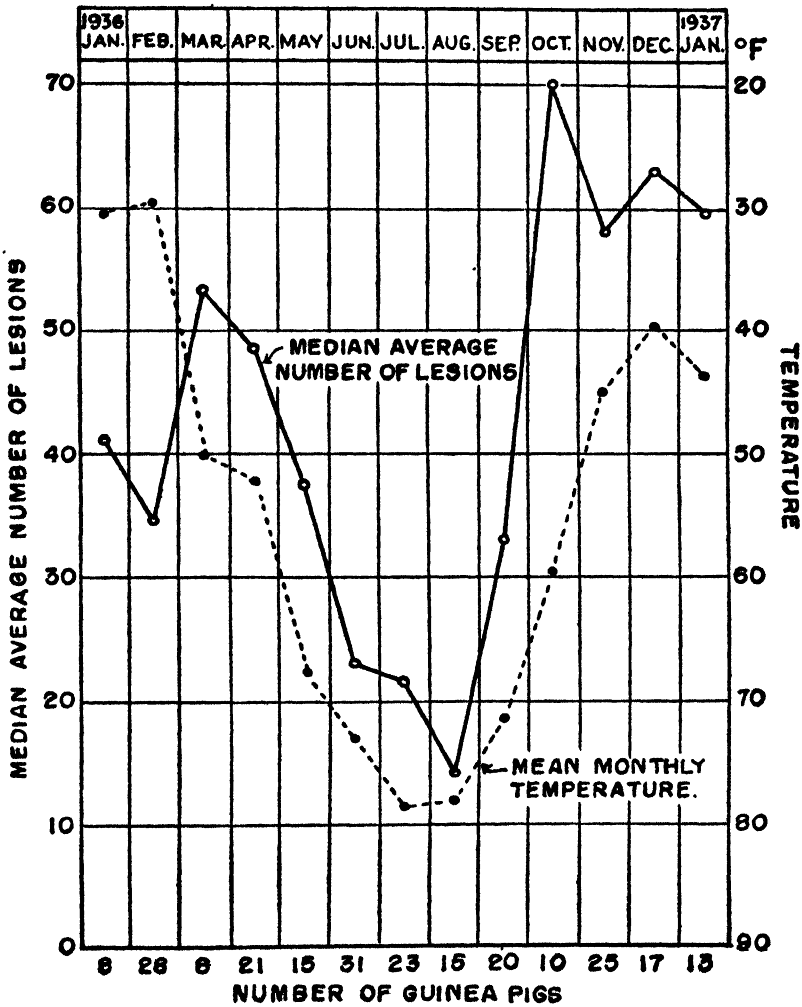

FIGURE 6.—Brain reaction in endemic typhus in guinea pigs and the mean monthly temperature (inverted) in Washington, D. C.

The averages were all higher than had been expected, and those for room temperature were higher than any monthly average that we had obtained. In searching for an explanation it was recalled that previous work (Lillie and Dyer 1936) had shown that the inoculum used in this experiment, testicular washings, had produced consistently

more marked average reactions than had blood, the other commonly used inoculum. Segregation of the series run from February 1, 1936, to January 31, 1937, according to the type of inoculum, showed that in several months the guinea pigs inoculated with testicular washings

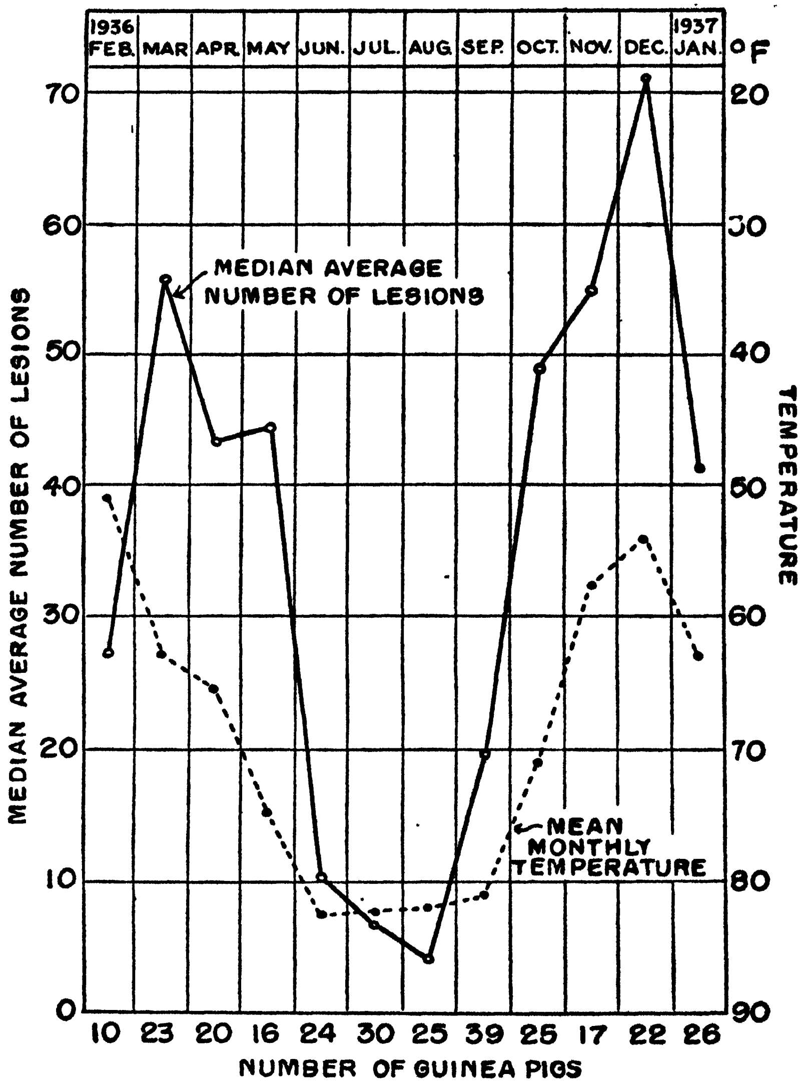

FIGURE 7.—Brain reaction in endemic typhus in guinea pigs and mean monthly temperature (inverted) in Mobile, Ala.

had shown as high average numbers of lesions as that encountered in the room temperature series of the artificial temperature experiment (fig. 8).

Returning to table 6, another unexpected finding was revealed, namely, that the 18° C. series showed a lower average number of

lesions than did the 24° C. group, but a higher median. If the median is the correct finding rather than the average, the results are consistent with the hypothesis of a direct temperature effect. If, on the other hand, the average, or the average of the middle two-thirds is the more nearly correct finding, a further explanation must be offered. Inasmuch as 15° C. to 18° C. is close to the minimum temperature at which we have been able to maintain guinea pigs without undue mortality from pneumonia, it is possible that the decreased average reaction may be an expression of decreased resistance in low environmental temperatures close to those at which guinea pigs are unable to survive.

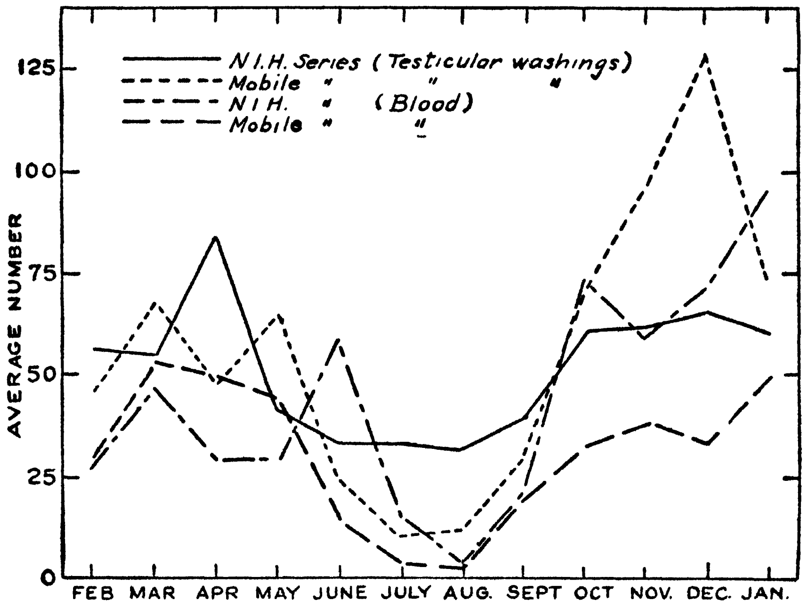

FIGURE 8.—Endemic typhus in guinea pigs Average numbers of brain lesions by months, and by inocula and place

TABLE 6.—*The effect of artificially controlled environmental temperature on the brain reaction of endemic typhus in guinea pigs*

Temperature of room (° C)	Number of guinea pigs	Average number of lesions per guinea pig	Extremes		Median number of lesions per guinea pig	Average number of lesions in median two-thirds of animals
			Low	High		
33	16	57.9	0	167	39 5	50 4
24	18	90.7	13	284	48	75 9
18	15	70.5	20	162	76	67.7

A further noteworthy finding in table 6 is that the average and median are notably higher for the 33° C. group than for any monthly

group of guinea pigs inoculated with testicular washings and killed during June, July, or August either in Washington or in Mobile. We are not able to explain this discrepancy at the present writing.

In an effort to reach some further correlations, detailed studies of the visceral pathology were made in this same series of 49 guinea pigs maintained under artificial temperature conditions, and crude quantitative estimates of the grade of reaction in each organ were made. The lesions were graded as to number and size as slight (±), moderate, (+), marked (++) and very marked (+++). As we have not previously presented data concerning the visceral reaction in endemic typhus in guinea pigs the following brief description and correlation are offered.

The heart often showed cloudiness, swelling, and fine granularity of the muscle fiber cytoplasm with or without partial obscuration of the cross striations. This did not vary on the average among the three temperature groups. In addition, more or less numerous focal lesions were present. These were foci of interstitial or perivascular lymphocyte infiltration, alone or accompanied by swelling or proliferation of fibroblasts or capillary, sometimes arteriolar endothelia, sometimes purely proliferative in character. Their most frequent sites were in the papillary muscles and beneath the mural endocardium of the ventricles, then in the epicardium of the coronary sulcus, then in the walls of the ventricles and atria. These focal lesions appeared to be distinctly but not markedly more frequent and extensive in the animals maintained at 18° and 24° C. than in those kept at 33° C. Also there were relatively infrequent small foci of subendothelial fibroblast proliferation, small clumps of lymphocytes, or small patches of endothelial stratification in the heart valves, but it was questionable whether the maintenance temperature had any effect on the frequency of valve foci.

In the lung, small patches of atelectasis and carnifying or resolving pneumonia were encountered in all three groups in not significantly different frequency, which, in view of the frequency of such lesions in guinea pigs used in various other studies, are probably to be disregarded. Perivascular lymphocyte infiltration was almost constant, and often went on to the formation of lymphoid follicles with germinal centers containing often swollen phagocytic reticulum cells with ingested pyknotic nuclear fragments. While the frequency of the perivascular lymphocyte infiltration was similar in the three groups, follicle formation was over three times as frequent in the 18° and 24° C. groups as in the 33° C. group.

In the tracheobronchial lymph nodes, germinal centers were quite regularly present. Swollen intrafollicular reticulum cells with variable amounts of phagocytosed nuclear debris were often present, and this reaction was distinctly more pronounced in the 18° and 24° C. groups

than in the 33° C. group. Pulp reticulum cell swelling, edema, sinus reticuloendotheliosis, macrophage exudation, and other pulp and sinus reactions were infrequent and present in not significantly different frequency in the several groups.

The spleen pulp commonly presented moderate swelling of the sinus reticuloendothelium with some inconstant exudation of macrophages and erythrophagia and a variable, inconstant, pulp congestion. Sometimes the pulp contained a few normoblasts or an occasional megakaryocyte, and in one animal some myelocytes as well as more numerous normoblasts and megakaryocytes. None of these conditions could be correlated with the temperature grouping. The presence of lymphoblastic germinal centers in the splenic follicles was somewhat, but possibly not significantly, more frequent in the 18° and 24° C. groups. Swelling of follicle reticulum cells with phagocytosis of nuclear fragments, and the presence of clumps of polymorphonuclear leucocytes in pulp and sinuses were significantly greater in the 18° and 24° C. groups than in the 33° C. group. The lack of change in sinus reticuloendothelial reaction in the different temperature groups disagrees with, and the increased karyorrhexis and phagocytic activity in the follicle centers in the lower temperature group directly contradicts, the findings of Huggins and Noonan regarding the increased phagocytosis of carbon in bone marrow of rats at higher temperatures. However, it is improbable that sinus reticuloendothelial phagocytic activity of marrow has the same significance as centrofollicular activity in the spleen and lymph nodes and follicles.

Other than an inconstant, usually slight, and probably not significant capillary congestion, the liver showed no lesions.

Clumps of lymphocytes were seen in the adrenal medulla in a minor number of animals in all three groups in not significantly different frequency or intensity. Similarly, foci of perivascular or interstitial lymphocyte infiltration or vascular adventitial or endothelial proliferation were seen in the renal cortex in most of the animals. Both the frequency and intensity of these focal lesions were greatest in the 33° C. group, while, conversely, the frequency and intensity of foci of lymphocyte infiltration of the renal pelvis was 2 and 3 times as great in the 24° and 18° C. groups compared with the 33° C. group.

Marrow from the vertebrae and the upper half of the tibia was studied. Red marrow was present in both locations in all animals. Fatty marrow was present below about the middle of the tibial diaphysis in a number of animals. Generally granular myelocytes were the predominant cell type, metamyelocytes and leucocytes were present in small to moderate numbers, and moderate numbers of normoblasts were identified. Maturation of leucocytes and erythropoiesis seemed slightly more active in the 18° C. than in the 24° or 33° C. groups. Megakaryocytes were distinctly more numer-

ous in the 18° and 24° C. groups. These mature guinea pigs failed to show the hemopoietic response in the tibial marrow to temperature variations which was expected from the experiments of Huggins and Blacksom with white rats.

Pronounced reactions in one organ were often not associated with pronounced reactions in other organs or in the brain in the same animal. When the animals were grouped in four groups according to the intensity of the brain reaction, the highest average visceral

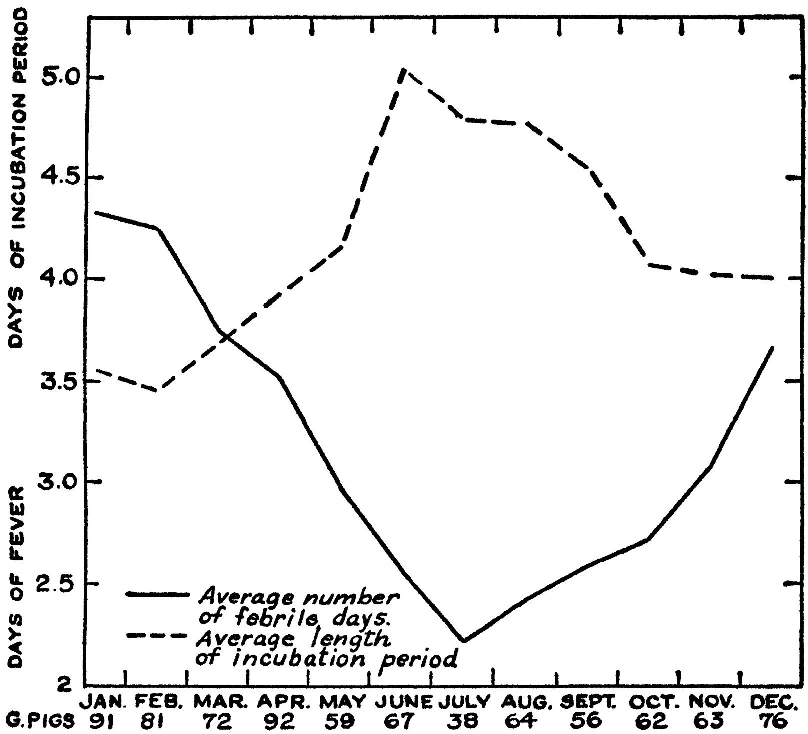

FIGURE 9.—Endemic typhus, seasonal variation in average number of days of fever (above 39.6° C.) and in average length of incubation period in guinea pigs inoculated with testicular washings, 1929–36.

reactions were found in the two groups showing the least and greatest numbers of brain lesions.

However, when the average visceral reactions are segregated according to the temperature grouping, the 33° C. group shows a definitely less marked average visceral reaction than the other two groups, thus agreeing with the brain reaction. Hence, the lesser intensity of the brain reaction in higher environmental temperatures cannot be ascribed to any compensatorily greater visceral reaction.

Following an impression that clinical reactions in endemic typhus in guinea pigs were more pronounced in the winter months, the individual records of all guinea pigs inoculated with the Wilmington

strain from October 1929 to September 1936 were examined and a compilation was made of all uncomplicated attacks in which the animals were allowed to recover. The number of days on which the rectal temperature was 39.6° C., or higher, and the incubation period were recorded for each animal and averages were calculated for each month, assigning each animal to the month in which the inoculation was made.

It was found that the average number of febrile days was greatest during the winter months and least in the summer and that the

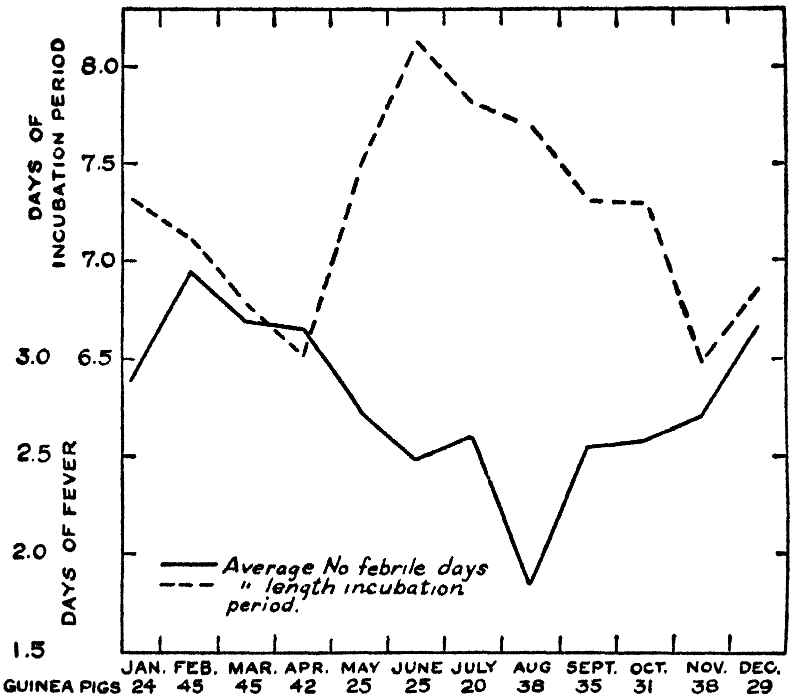

FIGURE 10—Endemic typhus, seasonal variation in average number of days of fever (above 39 6° C.) and in average length of incubation period in guinea pigs inoculated with blood, 1929-36.

incubation periods were, conversely, longest in summer and shortest in winter. These results are shown in figures 9 and 10 for testicular washings and blood inocula, respectively. Maximum numbers of febrile days were recorded in January at 4.3 for testicular washings and in February at 3.4 for blood, and minima in July at 2.2 and August at 1.8, respectively. Incubation periods were longest in June, 5.0 and 8.1 days for testicular washings and blood inocula, respectively, shortest in February with testicular washings (3.5 days) and in April and November (6.5 days) with blood.

27241°—37——2

SUMMARY

The average intensity of the brain reaction of the St. Louis encephalitis in mice is greatest during the winter months and least in the summer, and roughly parallels an inverted environmental temperature curve. Artificially high environmental temperature decreases and low temperature increases the average intensity of the brain reaction in mice simultaneously inoculated with the same material.

The average intensity of the brain reaction of endemic typhus in guinea pigs is also greatest in the winter and least in the summer months, and again roughly parallels an inverted environmental temperature curve. Artificially high environmental temperature again decreases the average intensity of the brain reaction as compared with that of other animals simultaneously inoculated with the same material.

The visceral lesions in endemic typhus varied less markedly in intensity, but were definitely less marked on the average in animals kept under artificially elevated environmental temperatures.

The clinical reaction, as expressed by the average total number of febrile days, was most severe in winter and least in summer, and the incubation period was conversely longest in summer and shortest in winter.

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CITY HEALTH OFFICERS, 1937

Directory of Those in Cities of 10,000 or More Population

Directories of the city health officers in the cities of the United States having populations of 10,000 or more have been published in the Public Health Reports and reprinted as separates [1] for each year from 1916 to 1936, except 1932 and 1935, for the information of health officers and others interested in public health activities. These direc-

[1] Reprints Nos. 346, 416, 494, 539, 599, 702, 767, 876, 930, 1025, 1103, 1177, 1257, 1333, 1426, 1521, 1613, 1685, and 1783, from the Public Health Reports.

tories have been compiled from data furnished by the health officers. The cities included in this directory are those having populations of 10,000 or more according to the 1930 census.

The asterisk (*) indicates that the officer before whose name it appears has been reported to be a "whole-time" health officer. For this purpose a "whole-time" officer is defined as "one who does not engage in the practice of medicine or in any other business, but devotes all his time to official duties."

City	Name of health officer	Official title
Alabama:		
Anniston		
Bessemer	*J. D. Dowling, M. D.	County health officer.
Birmingham	*Judson D. Dowling, M. D.	Do.
Decatur	*Lee Roy Murphree, M. D., C. P. H.	Do.
Dothan	*W. T. Burkett, M. D.	Do.
Fairfield	*J. T. Duncan	Health and sanitary inspector.
Florence	*G. E. Newton, M. D.	County health officer.
Gadsden	*C. L. Murphree, M. D.	Do.
Huntsville	*W. C. Hatchett, M. D.	Do.
Mobile	*O. L. Chason, M. D., Dr. P. H.	Do.
Montgomery	*J. L. Bowman, M. D.	Do.
Phenix City	*Marion L. Shaddix, M. D.	Do.
Selma	*L. T. Lee, M. D.	Do.
Tuscaloosa	*A. A. Kirk, B. S. in Commerce, M. D.	Do.
Arizona:		
Phoenix		
Tucson	*Lewis H. Howard, M. D.	Director, Pima County health service.
Arkansas:		
Blytheville	C. E. Wilson, M. D.	City health officer.
El Dorado	F. O. Mahony, M. D.	Do.
Fort Smith	*James E. Johnson, M. D.	District health officer.
Hot Springs	*J. F. Merritt, M. D.	City and county health officer.
Jonesboro	R. C. Shanlever, Ph. G., M. D.	Chairman, board of health.
Little Rock	*Thomas M. Fly, M. D.	City health officer.
North Little Rock	W. M. Burns, M. D.	Health officer.
Pine Bluff	*Walter Hugh Bruce, M. D.	Director, county health department.
Texarkana		
California:		
Alameda	Leonard E. Skilling, M. D.	Health officer and city physician.
Alhambra [1]	*S. J. Stewart, M. D.	District health officer.
Anaheim	*K. H. Sutherland, M. D.	County health officer.
Bakersfield	Peter J. Cuneo, LL. B., M. D.	City health officer.
Berkeley	*Frank L. Kelly, M. D., Dr. P. H.	Health officer and local registrar.
Beverly Hills	Harry Hoagland Blodgett, M. D.	City health officer.
Brawley	John L. Parker, M. D.	Do.
Burbank [1]	T. H. Ransom, M. D.	District health officer.
Burlingame	M. F. Desmond, M. D.	Health officer.
Compton [1]	*F. E. Estes, M. D.	District health officer.
Eureka	William J. Quinn, M. D.	Health officer.
Fresno	Carlton Mathewson, M. D.	City health officer.
Fullerton	*Kenneth H. Sutherland, M. D.	County health officer.
Glendale [1]	*F. A. Wilmot, M. D., D. P. H.	District health officer.
Huntington Park [1]	*G. M. Malkin, M. D.	Do.
Inglewood [1]	*J. W. Robinson, M. D.	Do.
Long Beach	*G. E. McDonald, M. D.	City health officer.
Los Angeles	*George Parrish, M. D.	Health officer.
	*George M. Stevens, M. D.	Epidemiologist and first assistant health officer.
	*G. F. Schmelzel, M. D.	Chief deputy health officer.
	*A. L. Peterson	Executive assistant.
	Division directors:	
	*Charles F. Kiley	Chief accountant.
	*J. L. Lanigan	Secretary to health board.
	*Harry Cohn, M. D.	Director of tuberculosis.
	*Agnes M. Talcott	Director of nurses.
	*F. W. Peterson	Director of vital statistics.
	*John Carman	Chief chemist.
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	*H. Manning Elliott, M. D.	Director of venereal clinic (male).
	*Lola Pedlow, M. D.	Director of venereal clinic (female).
	Lyle McNeile, M. D.	Director, maternity division.
	*C. K. Stewart	Director of rodent division.

[1] Under supervision of Dr. J. L. Pomeroy, health officer of Los Angeles County, Hall of Justice, Los Angeles, Calif.

City	Name of health officer	Official title
California—Continued		
Los Angeles—Contd	*J M. Cain	Director of quarantine and morbidity division.
	*L. V. Dieter, D. Phar	Director of laboratories.
	*Lillian Kositza, M. D	Director, child hygiene division.
Modesto	*E F. Reamer, M. D	County health officer.
Monrovia [1]	J. M. Furstman, M. D	District health officer.
Oakland	*N N. Ashley, M. D	Health officer.
Ontario	Calvert L Emmons, M. D	City health officer.
Palo Alto	*Louis Olsen, S E	Health officer.
Pasadena	*Wilton L Halverson, M. D., Dr. P H	Do.
Pomona [1]	*M. U Stoneman, M D	District health officer.
Redlands	Frank H Folkins, M. D	City health officer.
Richmond	Charles R. Blake, M D	Commissioner of health.
Riverside	*W A. Jones, M D	Do
Sacramento	*Herbert F True, M D	City health officer.
Salinas	*Mrs. Marie Fidel Whiteley, P. H. N	Do.
San Bernardino	G Stirling Landon, M D	Do.
San Diego	*Alex M Lesem, M D	Director of health.
San Francisco: Department of public health.	Health Advisory board:	
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	Alanson Weeks, M. D	
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	*C M Woolenberg, Ph. G	Director of institutions and superintendent, Laguna Honda Home.
	*L. M. Wilbor, M D	Superintendent, San Francisco Hospital
	*W. C. Vanderventer, M. D	Acting medical superintendent Hassler health home.
	Edmund Butler, M D	Chief surgeon, emergency hospital service.
	*J I. O'Dea	Chief steward, emergency hospital service
	George H. Becker, M. D	Director, bureau of communicable diseases.
	R. W. Burlingame, M. D	Resident physician, isolation division, San Francisco Hospital, and chief, division of venereal disease control.
	*P. S Barrett, M. D	Director, bureau of child hygiene.
	*Ernestine Schwab	Director, division of field nursing.
	Olga Bridgman, M D	Chief, division of mental hygiene.
	Robert Grosso, D D. S	Chief, division of dental hygiene
	*T. P. Lydon	Director, bureau of food and milk.
	*J J. Burke	Chief, food and restaurant inspection.
	*B. Q Engle	Chief, pasteurizing plant inspection.
	*C G Hansen	Chief, meat and market inspection.
	*F. W Orme, D. V. M	Chief, abattoir inspection.
	*A. B. Crowley	Chief, industrial hygiene.
	*H P Thyle	Chief, housing inspection.
	*W D Hobro	Chief, plumbing inspection.
	*Kathryn B Walker, M. D	Bacteriologist-in-charge, division of bacteriology serolo[illegible].
	*Clinton G Davis	Senior chemist, division of chemistry.
	*P R. Hennessy	Senior accountant.
	*R C. Miller	Vital statistician.
San Jose	*Henry C. Brown, M D	City health officer.
San Leandro	*Joseph P. Rose	Food inspector
San Mateo	James A Warburton, M D	City health officer.
Santa Ana	*Kenneth H Sutherland, M. D	County health officer.
Santa Barbara	*Clarence T. Roome, M D	Health officer
Santa Cruz	Mahlon D McPherson, M D	City health officer
Santa Monica [1]	*W F. Reasner, M. D	District health officer.
Santa Rosa	*E. J Helgren, B. S. in chemistry; Dr B	Health officer.
South Gate [1]	*G. M. Malkin, M D	District health officer.
South Pasadena	Darius Eshoo, Ph. B , M. D	City health officer
Stockton	*John J. Sippy, M. D	District health officer.

[1] Under supervision of Dr. J. L. Pomeroy, health officer of Los Angeles County, Hall of Justice, Los Angeles, Calif.

City	Name of health officer	Official title
California—Continued		
Vallejo	*E A. Peterson, M D	Health officer.
Ventura	*Charles R. Wylie, M. D	County health officer.
Whittier [1]	*R. L. Kaufman, M. D	District health officer.
Colorado:		
Boulder	*H L. Morency, Ph B , D. V. M	Director of public health.
Colorado Springs	Omer R. Gillett, Ph. B., M. D	Health officer.
Denver	*Theodore L. Williams, M. D	Deputy manager of health and charity.
Fort Collins	T C. Taylor, M. D	Health officer.
Grand Junction	E. H. Munro, M. D	City physician.
Greeley	Leo L. Lux, M. D	Do.
Pueblo	*W. E. Buck, M. D	Chief, department of health, sanitation and inspection.
Trinidad	W. L. Newburn, M. D	City physician.
Connecticut:		
Ansonia		
Bridgeport	*Richard O'Brien Shea, M. D	Health officer and registrar.
Bristol	Benjamin B. Robbins, M. D	City health officer.
Danbury	Felix F. Tomaino, M D	Do.
Derby	Thomas F Plunkett, M D	Do.
East Hartford	F W Brecker, M D	Do.
Enfield	Frank F. Simonton, M. D	Health officer.
Fairfield	Edward P Kemp, M D	Do.
Groton	Frank W. Hewes, M D	Do.
Hamden	George H. Joslin, M. D , D. P. H	Do.
Hartford	*Benjamin G. Horning, M. D., C. P H.	Do.
Manchester	D C. Y. Moore, M D	Chairman, board of health.
Meriden	Michael J Sullivan, M D	Health officer.
Middletown	*M L Palmieri, M. D , M P. H	Do.
Milford	C K. Heady, M. D	Do.
Naugatuck		
New Britain	*Louis J. Dumont, M D	Do.
New Haven	*Joseph I. Linde, M D	Do.
New London	*Benjamin N. Pennell, D. V. S	Do.
Norwalk	Robert E Perdue, M D	Do.
Norwich	Harrison Gray, M D	Do.
Shelton	Francis I. Nettleton, Ph B , M. D	Health commissioner.
Stamford	*Raymond D. Fear, M D , Dr. P. H	Do.
Stonington		
Stratford	Harold T. Oesau, M. D	Health officer.
Torrington		
Wallingford		
Waterbury	Edward J. Godfrey, M D	Do.
West Hartford	*Harry B. Smith, M D , M P. H	Director of health.
West Haven	Charles E. Kaufman, Ph B., M. D	Health officer.
Willimantic	N Spector, M. D	City health officer.
Delaware:		
Wilmington	Roger Murray, M D	Executive secretary, board of health.
District of Columbia:		
Washington	*George C. Ruhland, M D	Health officer
	*Daniel L Seckinger, M D	Assistant health officer.
	*Arthur G. Cole	Chief clerk and deputy health officer.
Bureau of preventable diseases.	*James G. Cumming, M. D	Director.
Medical inspection of schools	*Joseph A. Murphy, M. D	Do.
Food inspection	*Reid R. Ashworth, D. V. S	Do.
Sanitary inspection	*J Frank Butts, LL B	Do.
Vital statistics	*Joseph B. Irvine	Do.
Chemical laboratory	*John B. Reed	Do.
Bacteriological laboratory.	*John E. Noble	Do.
Serological laboratory.	*Jesse P. Porch, D. V. M	Do.
Child welfare and hygiene service.	*Hugh J. Davis, M. D	Do.
Tuberculosis	A. Barklie Coulter, M D	Do.
Nursing	*Mrs. Josephine Pittman Prescott	Do.
Maternity welfare	J. Bay Jacobs, M. D	Medical director.
Maternal and child welfare.	*Ella Oppenheimer, M. D	Director.
Public health instruction.	*Melvin P. Iseminger, M. D	Do.
Public health engineering.	*Claud F. Browning	Consultant.
Florida:		
Daytona Beach	*Simon Reed	Health officer.
Gainesville	W. Lassiter, M. D	City health officer.
Jacksonville	*N. A. Upchurch, M. D	Do.
Key West	William R. Warren, M. D	Do.
Lakeland		
Miami	*George N. MacDonell, M. D	Director of public health.

[1] Under supervision of Dr. J. L. Pomeroy, health officer of Los Angeles County, Hall of Justice, Los Angeles, Calif.

City	Name of health officer	Official title
Florida—Continued		
Orlando	Claude Anderson, M. D	City health officer.
Pensacola	*William H. Pickett, M. D., C. P. H.	Director, county health department.
St. Augustine	Herbert E. White, M. D	City health officer.
St. Petersburg	*Frederick F. Kumm, M. D	Do.
Sanford	J. N. Tolar, M. D	City physician.
Tallahassee	*Leander Johnson Graves, M. D	Director, county health unit.
Tampa	*James R. McEachern, M. D	City health officer.
West Palm Beach	W. E. Van Landingham, M. D	City health officer and city physician.
Georgia:		
Albany	*Thomas W. Collier, M. D	Commissioner of health.
Athens	*Wedford W. Brown, M. D	Do.
Atlanta	*John P. Kennedy, M D	City health officer.
Augusta	*Thomas B. Phinizy, M. D	Commissioner of health.
Brunswick	*Millard E. Winchester, M. D., Dr. P. H.	Do
Columbus	William E. Mayher, M. D	City health officer.
Decatur		
Griffin	*Thomas O. Vinson, M. D	Commissioner of health
Lagrange	*S. C. Rutland, M. D	County health officer.
Macon	*J. D. Applewhite, M. D., M. P. H.	Health officer.
Rome	*B. V. Elmore, P. H. G., M. D	County commissioner of health.
Savannah	*Victor H Bassett, M. D	City health officer.
Thomasville	J. R Dykes, M D	County health officer.
Valdosta	*Gordon T. Crozier, M. D., D. P H	City health officer.
Waycross	*George E. Atwood, M. D., D. P. H.	Commissioner of health.
Idaho		
Boise	*Rowland O. Taylor, LL. B	Health officer.
Pocatello		
Illinois		
Alton	C. C. Potter, M. D	Health commissioner.
Aurora	Arnold S Benson, M. D	Do.
Belleville	*George F Schilling	Health officer.
Berwyn	*E. K. Preis, M D	Health director.
Bloomington	Paul F. Kionka, M. D	Do
Blue Island	A. J. Roemisch, M. D	Commissioner of health.
Brookfield		
Cairo	C. L. Weber, M. D	Health officer.
Calumet City	Andrew Nady, M. D	Health commissioner.
Canton	J C. Simmons, M. D	City physician.
Centralia	G. N. Welch, M. D	Health officer.
Champaign	C George Appelle, M D	City health officer.
Chicago	*Herman N Bundesen, M. D	President, board of health.
	Joel I Connolly	Assistant to the president.
	Louis E. Schmidt, M D	Secretary, board of health.
Bureau of communicable diseases	Isaac D. Rawlings, M. D	Chief of bureau.
Bureau of child welfare.	Henry C. Niblack, M D	Do.
Bureau of laboratories and research.	John L. White, M. D	Do.
Bureau of dairy products, city division.	Paul F. Krueger	Chief.
Bureau of dairy products, country division H.	Henry C. Becker, M. D. V	Do.
Bureau of Administrative service.	Henry L. Porsche	Chief clerk.
Epidemiology	Wm. I. Fishbein, M. D	Epidemiologist
Social hygiene division.	George G. Taylor, M. D	Director.
Maternal and infant welfare.	Edward J. Denenholz, M. D	Do.
Chicago Heights	Hugo Long, M. D	City physician.
Cicero	Frank J. Pokorney, Ph. G , M. D	Health commissioner.
Danville	C M Cook, M. D	Director of health.
Decatur	*P. A. Steele, M. D.	Do.
East Moline	John Henry Fowler, M. D	Health officer.
East St Louis	*Albert P. Lauman	Commissioner of public health.
Elgin	*A. L. Mann, M. D	Executive officer.
Elmhurst	Frank D Leahy, M. D	President, board of health.
Elmwood Park	James A. Moxon, M. D	Health officer.
Evanston	*John W. H Pollard, M. D	Commissioner of health.
Forest Park	George J. Baumgartner, M. D	Do.
Freeport	Howard J Stickle, M. D	Health commissioner.
Galesburg	*F M. Giddings	Health officer.
Granite City	*M E. Kirkpatrick	Chairman, board of health.
Harrisburg	B E. Montgomery, M. D	City physician.
Harvey	John W. Blair, M. D	Health officer.
Highland Park	Donald E. Rossiter, M. D	President, board of health.
Jacksonville	Friederich Engelbach, M. D	City health warden.
Joliet	*E. J. Higgins, M. D	Commissioner of health.
Kankakee	*C. K. Smith, M. D	Health officer.
Kewanee	*L. H. Kopp	Sanitary inspector.

City	Name of health officer	Official title
Illinois—Continued		
La Grange	T. C. McDougal, M. D.	Health officer.
La Salle	*Arlington Ailes, M. D., C. P. H.	Health commissioner.
Lincoln	*George Seller	City health officer.
Mattoon	Lovell A. Neal, M. D.	Health commissioner.
Maywood	Charles M. Weinberg, M. D.	Do.
Melrose Park	Anthony P. Vincenti, B. Sc. in Chem., M. D.	Commissioner of health.
Moline	C. C. Ellis, M. D.	City physician.
Mount Vernon	C. O. Hamilton, M. D.	City health officer.
Oak Park	Frank S. Needham, M. D.	Commissioner of health.
Ottawa	E. P. Hatheway, M. D.	Health officer
Park Ridge	Randolph F. Olmsted, M. D.	Commissioner of health.
Pekin	C. G. Muehlmann, M. D.	Health officer.
Peoria	Sumner M. Miller, M. D.	Commissioner of health.
Quincy	*H. O. Collins, M. D.	Public health officer.
Rock Island	Edward B. de Silva, M. D.	City physician.
Rockford	*N. O. Gunderson, M. D.	Commissioner of health.
Springfield	H. H. Tuttle, M. D.	Superintendent of health.
Sterling		
Streator	T. K. Jennings, M. D.	President, board of health.
Urbana		
Waukegan	*Stanley J. Leckie	Health inspector.
West Frankfort	Wm. Thad Fife	City health officer
Wilmette	Martin H. Seifert, Ph. G., M. D.	Health commissioner.
Winnetka	*Howard A. Orvis, M. D., M. S. in public health	Health officer.
Indiana:		
Anderson	George B. Metcalf, M. D.	Health commissioner.
Bedford	*Charles Blackburn	City health commissioner.
Bloomington	Charles E. Holland, M. D.	Secretary, board of health.
Connersville	Herman W. Smelser, M. D.	County health commissioner.
Crawfordsville	Fred N. Daugherty, M. D.	Secretary, board of health.
East Chicago	David R. Johns, M. D.	Do.
Elkhart	A. W. Kistner, M. D.	Do.
Elwood	W. Merle Hoppenrath, M. D.	Do.
Evansville	Thomas F. Reitz, M. D.	Do
Fort Wayne	Karl C. Eberly, M. D.	Secretary and health commissioner.
Frankfort	Milton T. McCarty, M. D.	City health officer
Gary	Belfield Atcheson, M. D.	Health commissioner.
Goshen	G. A. Whippy, M. D.	City health officer
Hammond	H. C. Groman, Ph. B., M. D.	Secretary, board of health.
Huntington	R. F. Frost, M. D.	Do.
Indianapolis	*H. G. Morgan, M. D.	Health commissioner
Jeffersonville	Sam Adair, M. D.	Secretary, board of health.
Kokomo	Will J. Martin, M. D.	Do.
La Fayette	Harry J. Laws, M. D.	Do.
La Porte	Jon Nelson Kelly, M. D.	Health officer.
Logansport	*Louis P. Deuner	Health inspector.
Marion	G. R. Daniels, M. D.	Secretary, board of health.
Michigan City	N. R. Carlson, M. D.	Secretary and health officer.
Mishawaka	Francis W. Logan, M. D.	Secretary, board of health.
Muncie	Jules F. LaDuron, M. D.	Do.
New Albany	John P. Gentile, M. D.	Do.
Newcastle	Walter M. Stout, M. D.	Do
Peru	F. M. Lynn, M. D.	Do.
Richmond	Charles J. Hufnagel, M. D.	Do.
Shelbyville	Paul R. Tindall, M. D.	Do.
South Bend	F. R. Nicholas Carter, M. D.	Executive secretary and health officer.
Terre Haute	Maurice B. Van Cleave, M. D.	Secretary, city board of health.
Vincennes	Norman E. Beckes, M. D.	Secretary, board of health.
Whiting	Jeremiah A. McCarthy, M. D.	Health commissioner.
Iowa:		
Ames	B. D. Atchley, M. D.	City health officer.
Boone	William Woodburn, M. D.	Health officer.
Burlington	*Edwin H. Place, M. D.	Director, county health unit.
Cedar Rapids	V. H. Hasek, M. D.	City physician.
Clinton	J. C. Burke, M. D.	City health physician.
Council Bluffs	J. M. Moskovitz, M. D.	Health officer.
Davenport	George Braunlich, M. D.	Do.
Des Moines	Harry E. Ransom, M. D.	City health commissioner.
Dubuque	Walter J. Connell, M. D., M. P. H.	Health director.
Fort Dodge	Thomas M. Riordan	Sanitary officer.
Fort Madison	Joseph M. Casey, M. D.	City physician.
Iowa City	E. W. Paulus, M. D.	Health officer.
Keokuk	Charles A. Dimond, M. D.	Physician, board of health.
Marshalltown	R. S. Grossman, M. D.	Health officer.
Mason City	C. M. Franchere, M. D.	City health director.
Muscatine	Rodney M. Arey, M. D.	Do.
Newton	E. A. McMurray, M. D.	City health physician.
Oskaloosa	Oscar J. DuBois, D. O.	City health officer.
Ottumwa		
Sioux City	*W. S. Petty, M. D.	Director, county health unit.
Waterloo	R. W. Driver, M. D.	Health officer.

City	Name of health officer	Official title
Kansas:		
Arkansas City	P. F Theis, M D	City health officer.
Atchison	William K Fast, M. D	City and county health officer.
Chanute	James A. Butin, M. D	City health officer.
Coffeyville	P S. Townsend, M. D	Do.
Dodge City	X F Alexander, M. D	County health officer.
Eldorado	Mac Childs	Milk and dairy inspector.
Emporia	*C. H. Munger, M. D	County health officer.
Fort Scott	Charles L Mosley, M D	City health officer.
Hutchinson	Guy R. Walker, M. D	City physician.
Independence	E. C. Wickersham, M. D	City and county health officer.
Kansas City	*Wm. F. Lunsford, M. D., M. P. H	City director of health.
Lawrence	James M. Mott, M D	Superintendent of public health.
Leavenworth	Alonzo R Adams, M. D	City physician.
Manhattan	Darrel L Evans, M D	County health officer.
Newton	W. F Schroeder, M. D	Do.
Parsons	L A. Proctor, M D	City health officer
Pittsburg	W G. Rinehart, Ph. G., M. D	City physician.
Salina	Edgar M Sutton, M. D	County health officer.
Topeka	*C. B Stephens, M. D	City health officer.
Wichita	J E Wolfe, M D	Director of public welfare.
Kentucky:		
Ashland	*Robert Donald Higgins, M. D., M P. H	Director, county health department.
Bowling Green	*G M. Wells, M D	Do.
Covington	Theodore Sallee, M. D	City health officer.
Fort Thomas		
Frankfort	R M Coblin, M. D	Do
Henderson	*J Leland Tanner, M D, M. P H	Health officer.
Hopkinsville	Philip E. Haynes, M. D	City health officer
Lexington	*Charles M. Moore, M. D	Do.
Louisville	*Hugh R Leavell, M. D	Director, city health department.
Newport	John Todd, M D	City health officer
Owensboro	A L Kinchelow, M D	County health officer.
Paducah	*Russell E. Teague, M. D., C P. H	Do
Louisiana:		
Alexandria	*R. B. Wallace, M D	City health officer.
Baton Rouge	T Jeff McHugh, M. D	Do.
Bogalusa	*J. H Slaughter, M. D	City physician.
Lafayette	G A Martin, M D	Do
Lake Charles	H B White, M. D	President, board of health.
Monroe		
New Orleans	James M. Batcheler, M D	Superintendent of public health.
Shreveport	*W. J. Sandidge, M. D., C. P. H	Director, city-parish health department
Maine		
Auburn	*Shirley J. Davis, R N	Health officer.
Augusta	George A Coombs, M D	City health officer.
Bangor	*Harry D. McNeil, M D	Health officer.
Bath	Joseph I. Smith, M D	Do.
Biddeford		
Lewiston	*Robert J. Wiseman, Jr, M. D	Health officer.
Portland	*Thomas Tetreau, M D	Local health officer
Sanford	*William H. Kelly, M. D	Do.
South Portland		
Waterville	*Arthur R. Daviau, M. D	Health officer.
Westbrook	Patrick H. Welch	Local health officer.
Maryland:		
Annapolis	*William J. French, M. D	County health officer.
Baltimore		
Administration	*Huntington Williams, M. D., Dr. P H	Commissioner of health.
	*William H. F. Warthen, M. D	Assistant commissioner of health.
	*George W. Hemmeter, M. D	Health officer, western health district.
	John A. Skladowsky, M. D	Health officer, southeastern health district.
Bureau of vital statistics.	W. Thurber Fales	Director.
Bureau of health information.	*Dorothy Yoe Kalben	Do.
Medical section		
Bureau of communicable diseases.	*David H Andrew, M. D	Do.
Sydenham Hospital.	*Myron G. Tull, M. D	Superintendent.
Bureau of tuberculosis.	*Phineas J. Sparer, M. D	Director.
Bureau of venereal diseases.	*Ferdinand O. Reinhard, M. D	Do.
Bureau of occupational diseases.	*John M. McDonald, M. D	Do.
Bureau of child welfare.	*William K. Skilling, M. D	Do.
Division of school hygiene	*H. Warren Buckler, M. D	Chief.
Dental clinics	Morris Cramer, D. D. S	Supervisor.
Laboratories	*C. Leroy Ewing	Director.

City	Name of health officer	Official title
Maryland—Continued		
Baltimore—Contd.		
Medical Section—Continued		
Public health nursing.	*Jane B. Laib, R. N.	Director.
Sanitary section.	*R. S. Craig	Do.
Bureau of milk control.	*Ivan M Marty	Do.
Bureau of food control.	*Ferdinand A. Korff	Do.
Bureau of meat inspection.	*William Brenner, V. D.	Chief.
Bureau of environmental hygiene.	*William H. Schulze, Phar. D.	Director.
Cumberland	*Joseph P Franklin, M D	City health officer
Frederick	*E. C Kefauver, M. D.	City and county health officer.
Hagerstown	*W. R. Cameron, M D, C. P. H.	Do
Salisbury	*S. H. Hurdle, M D	City health officer.
Massachusetts.		
Adams	James F. McLaughlin, M. D.	Chairman, board of health.
Amesbury	Clarence S Morse	Agent, board of health
Arlington	*William H. Bradley	Do.
Athol	Marion B Sibley, M D	Secretary, board of health.
Attleboro	Ralph P Kent, M D.	Health officer.
Belmont	*Keble B Perine	Agent, board of health.
Beverly	*Alonzo O Woodbury	Clerk and agent, board of health.
Boston	*Henry F. R Watts, M D	Health commissioner.
	*Joseph A. Cahalan	Secretary
Divisions:		
Medical	*M Victor Safford, M D	Deputy commissioner.
Communicable diseases	*Frederick J Bailey, M D	Do
Bacteriological laboratory	*Karl R Bailey, M D.	Do
Food	*P H Mullowney, D V M	Do
Child hygiene	Charles F Willinsky, M D	Do
Sanitary	*M Victor Safford, M D	Acting deputy commissioner.
Tuberculosis	*George O'Donnell, M D	Deputy commissioner
Vital statistics	*Joseph W Monahan.	Do
Braintree	*John A Hedlund	Health officer.
Brockton	Charles D McCann, M D	Do
Brookline	Francis Parkman Denny, M D	Do
Cambridge	Simon B. Kelleher, M D	Medical inspector
Chelsea	*John F Welch	Health officer
Chicopee	*Paul G Martel	Agent, board of health.
Clinton	*Frederick E Murphy	Health officer
Danvers		
Dedham	Thomas J Brennan	Do
Easthampton	Charles J Hanson, M D	Agent, board of health.
Everett	*William F. Hogan	Do
Fairhaven	*W Fred Delano	Secretary and executive officer.
Fall River	*Ernest M. Morris, M D, C. M	Health commissioner
Fitchburg	*Fred R Brigham	Agent, board of health
Framingham	*David Moxon, C P H	Do
Gardner	*William P O'Donnell	Do.
Gloucester	*Patrick E Curley	Health officer
Greenfield	*George P Moore	Health agent and milk inspector.
Haverhill	*Frederick W. Morse	Clerk and agent, board of health.
Holyoke	*Daniel P Hartnett, Ph G	Agent and health officer
Lawrence	*Daniel J Costello	Clerk, board of health
Leominster	*Hugh E Crain	Agent and plumbing inspector.
Lowell	*John J McNamara, S E, M D	Director of health
Lynn	James A Dumas, M D	Commissioner of public health
Malden	*May C. Welsh	Clerk and agent, board of health.
Marlboro	*Mary N. O'Connor, R. N	Board of health nurse.
Medford		
Melrose	Clarence P. Holden, M. D	Chairman, board of health.
Methuen	John Oddy, M. D	Board of health physician.
Milford		
Milton	Paul W. Kimball, M D	Agent, board of health.
Natick	Charles D Colford, D. M D	Do.
Needham	*G. Donald Buckner	Health officer and milk inspector.
New Bedford	*A. N. Senesac, M D	Agent and medical officer.
Newburyport	*Wilbur N. O'Brien, PH. G	Agent, board of health.
Newton	*Harold D. Chope, M. D., M P. H	Director of public health.
North Adams	*Douglas W. Hyde, S. E	Agent, board of health.
North Attleboro		
Northampton	*George R Turner	Do.
Norwood	*John A. Shannon	Do.
Peabody	*Percy F. Murray	Do.
Pittsfield	*Willys M. Monroe, M. D., M. P. H.	Health commissioner.
Plymouth	Almeda Chandler	Clerk, board of health.
Quincy	Richard M Ash, M. D	Health commissioner.
Revere	*Patrick C. Bruno	Health officer and milk inspector.
Salem	*John J. McGrath	Agent, board of health.
Saugus	James A. Clark, M. D	Chairman, board of health.

City	Name of health officer	Official title
Massachusetts—Contd.		
Somerville	*Frank L. Morse, M. D.	Medical inspector and bacteriologist.
Southbridge	*Albert R. Brown	Agent, board of health.
Springfield	*Lawrence J. Smith, M. D.	Commissioner of public health.
Stoneham	*George A. Hinchcliffe	Health officer.
Swampscott	*Clarence W. Horton	Do.
Taunton	John I. McNamara, M. D.	Chairman, board of health.
Wakefield	David Taggart	Health officer and agent.
Waltham	*Joseph T. Mulcahy	Director of public welfare.
Watertown	*Fred W. Bodge	Health officer.
Webster	Arthur D. Chartier, M. D.	Board of health physician.
Wellesley	Curtis M. Hilliard	Supervisor of health.
West Springfield	John J. Lysaght	Agent, board of health.
Westfield	Robert M Marr, M. D.	Chairman, board of health.
Weymouth	Frederick L. Doucett, M. D.	Clerk, board of health.
Winchester	*Maurice Dinneen	Agent, board of health.
Winthrop	*William D. Childress	Health officer.
Woburn	*Edward F. Gorman	Agent and Secretary of board of health.
Worcester	*Peter O. Shea, M. D.	Director of health and school hygiene.
Michigan.		
Adrian	W. S Mackenzie, M. D.	Health officer.
Alpena	Francis J. O'Donnell, M D.	City health officer.
Ann Arbor	John A. Wessinger, M. D., Dr. P. H.	Do.
Battle Creek	*A. A. Hoyt, M D.	Health officer.
Bay City	George W. Moore, M. D.	Do.
Benton Harbor	E. R. Taylor, M. D.	Director of public health.
Dearborn	Clarence A. Christensen, M. D.	Commissioner of health and sanitation.
Detroit	Board of health:	
	Gustavus D. Pope	President.
	William M. Walker	Vice president.
	William A. Evans, M. D.	
	Ledru O. Geib, M. D.	
	F Gardner Legg, B. C. E.	Secretary.
	Executive staff, department of health:	
	*Henry F Vaughan, Dr P. H	Commissioner.
	Bert U Estabrook, M. D.	Deputy commissioner.
	*Fred M. Meader, M. D.	Deputy commissioner and director of medical services
	*Don W. Gudakunst, M. D., Dr. P H	Deputy commissioner and director of school health service.
	*Bruce H. Douglas, M. D.	Tuberculosis controller.
	*G M Byington, M. D.	Director of medical relations.
	*Joseph A. Kasper, M. D	Director, public health laboratories.
	*Carey P McCord, M D.	Director, bureau of industrial hygiene.
	*F. Gardner Legg, B. C. E.	Director, bureau of sanitary engineering
	*Edward C. Schultz	Director, bureau of dairy and food inspection.
	*John F. Roehl	Director, division of special investigation.
	*George Sewell, M. D.	Acting director, division of social hygiene.
	*Grace Ross, R N.	Director, division of nursing.
	*Franklin H. Top, M. D., C. P. H.	Director, division of epidemiology.
	Russell W. Alles, M. D.	Director, prenatal clinics.
	Otto Grob, M. D.	Acting director, division of child welfare.
	A. C. Thompson, D. D. S.	Director, school dental service.
	*G Arthur Blakeslee	Director, division of vital statistics.
	*Sophia Halsted, M. S.	Director, division of nutrition.
	*M. Eleanor McGarvah	Legal aid.
	*Mary P. Connolly	Director, division of health education and editor "City Health."
	*Emma A. Boldt	Assistant secretary.
	*George E. Phillips	Superintendent, Herman Kiefer Hospital.
	*Henry S. Willis, M. D.	Superintendent, William H. Maybury Sanatorium.
Ecorse		
Escanaba		
Ferndale	C. A. Mooney, M. D.	Health officer.
Flint	*George Hays, M. D.	Health officer and registrar.
Grand Rapids	*John L. Lavan, M. D.	Health officer.
Grosse Pointe	*Benjamin H. Warren, M. D.	Health commissioner.
Hamtramck	Stephen S. Skrzycki, M. D.	Do.
Highland Park	William N. Braley, M. D.	Health officer.
Holland	W. M. Tappan, M. D.	Do.
Iron Mountain	J. L. Browning, M. D.	Do.
Ironwood	C. C. Urquhart, M. D.	City health officer.
Jackson	*Elmer J. MacLachlan, D. V. M.	Health officer.
Kalamazoo	*Irmel W. Brown, M. D.	Director of public health and welfare.
Lansing	*E. R. Van der Slice, M. D.	Director of health.
Lincoln Park	Dan R. Herkimer, M. D.	Health officer.
Marquette	*Charles P. Drury, M. D.	Do.
Menominee	John T. Kaye, M. D.	Do.

City	Name of health officer	Official title
Michigan—Continued		
Monroe	James A. Humphrey, M. D.	Health officer.
Mount Clemens	W. J. Kane, M. D.	Do.
Muskegon	M. E. Stone, M. D.	Do.
Muskegon Heights	Otto M. LaCore, M. D.	Do.
Niles	Lawrence M. Rutz, M. D.	Health commissioner.
Owosso	W. E. Ward, M. D.	City health officer.
Pontiac	*Charles A. Neafie, M. D., M. S. in P. H.	Director of public health.
Port Huron	A. L. Callery, M. D.	Health officer
River Rouge	Claude A. Smith, M. D.	Do
Royal Oak	Donald A. Cameron, M. D.	City health officer
Saginaw	*Frank A. Poole, M. D.	Do.
Sault Ste. Marie	*David Littlejohn, LL. D., M. D., Dr. P. H.	Director, county health department.
Traverse City	George A. Holliday, D. D. S., M. D.	Health officer
Wyandotte	E. H. Engel, M. D.	Health commissioner.
Ypsilanti	Bradley M. Harris, M. D.	Health officer.
Minnesota.		
Albert Lea	Donald S. Branham, M. D.	Do
Austin	H. M. Fisch, M. D.	City health officer
Brainerd	R. A. Beise, M. D.	Chairman, board of health
Duluth	*Mario McC. Fischer, M. D.	Director of public health.
Faribault	Frederick C. Davis, M. D.	Health commissioner.
Hibbing	Carl N. Harris, M. D.	Health director.
Mankato	Henry Bradley Troost, M. D.	City health officer
Minneapolis	*Francis E. Harrington, LL. D., M. D.	Commissioner of health.
Rochester	T. B. Magath, M. D.[1]	Health officer
St. Cloud	Henry W. Goehrs, M. D.	City physician
St. Paul	*Robert B. J. Schoch, M. D.	Chief health officer.
South St. Paul	O. S. Ely, M. D.	Commissioner of health.
Virginia	Robert P. Pearsall, M. D.	Health officer.
Winona	William V. Lindsay, M. D.	Do.
Mississippi:		
Biloxi	*E. E. Moore	Sanitary inspector.
Clarksdale	*N. C. Knight, M. D., C. P. H.	Director, county health department.
Columbus	C. E. Lehmberg, M. D.	County health officer
Greenville	*John W. Schackelford, M. D., M. P. H.	Director, county health department.
Greenwood	*Levi A. Barnett, M. D.	Director of health
Gulfport		
Hattiesburg	*B. D. Blackwelder, M. D., C. P. H.	Director, county health department.
Jackson	*William Earl Noblin, M. D.	Do
Laurel	*A. R. Perry, M. D., M. P. H.	Do
McComb	*T. Paul Haney, Jr., M. D., C. P. H.	County health officer.
Meridian	*D. V. Galloway, M. D., M. P. H.	Do.
Natchez	*C. R. Gillespie, M. D.	Director, county health department.
Vicksburg	*F. Michael Smith, M. D.	Do.
Missouri		
Cape Girardeau	*C. C. Summers	Health officer.
Columbia	A. W. Kampschmidt, M. D.	Health commissioner.
Hannibal	*E. M. Lucke, M. D.	Health officer
Independence	*Joseph T. Brennan, M. D.	County health commissioner.
Jefferson City	James G. Bruce, M. D.	City physician
Joplin	V. E. Kenney, M. D.	Commissioner of health and sanitation.
Kansas City	Edwin H. Schorer, M. D., Dr. P. H.	Health director
Maplewood	E. E. Tremain, M. D.	Commissioner of health.
Moberly	Ottis O. Ash, M. D.	City health commissioner.
St. Charles	L. E. Belding, M. D.	City health officer.
St. Joseph	J. M. Allaman, Ph. G., M. D.	Health officer.
St. Louis	*Jos. F. Bredeck, M. D., D. P. H.	Health commissioner.
	*H. I. Spector, M. D.	Assistant health commissioner.
	*Jos. C. Willett, D. V. M.	Chief of laboratories.
	Arthur Kelley	Chief of food control
	Milton R. Fisher, D. V. M.	Milk controller
	*Walter E. Cook	Acting chief sanitary section.
	*Harry M. Stamm, D. D. S.	Dental supervisor.
	*Clyde Kane, M. D.	Acting chief, venereal clinic.
	*Mildred Sanderson, R. N.	Municipal nurses' supervisor.
	*W. C. Dillard, D. V. M.	Veterinary meat inspector.
	*H. V. Persells, D. V. M.	Do.
	*C. B. Michael, D. V. M.	Do
	*Downey L. Harris, M. D.	Rabies controller.
	*Elmer Rosenthal	Recorder of births and deaths.
	J. Earl Smith, M. D.	Epidemiologist.
	*O. W. Noyes, D. V. M.	Supervisor, meat control.
	*Arthur H. Knost, D. V. M.	Veterinary milk inspector.
	*L. A. Rosner, D. V. M.	Do.
	*C. A. Paige, D. V. M.	Do.
Sedalia	E. C. Snavely, M. D.	Health officer.

[1] D. C. Lockhead, M. D., D. P. H., deputy health officer, full time.

City	Name of health officer	Official title
Missouri—Continued		
Springfield	*Charles A. George, M. D	Commissioner of health and sanitation.
University City	O. P. Hampton, Jr., M. D	Health commissioner.
Webster Grove	Carl C. Irick, M. D	Do.
Montana:		
Anaconda	J. L. O'Rourke, M. D	City health officer.
Billings	A. E. Stripp, M. D	Do.
Butte	Frank J. Williams, M. D	Do.
Great Falls	*Frank L. Watkins, M D	City and county health officer.
Helena	*R. G. M. Ehlers, M. D., C. P. H	Do.
Missoula	*F. D. Pease, M. D	Health officer.
Nebraska:		
Beatrice	J. R. Leibee, M. D	City physician.
Fremont	Richard T. Van Metre, M. D	City health officer.
Grand Island	John G. Woodin, M. D	City physician.
Hastings	J. W. Brown, M. D	Do.
Lincoln	*Milton F. Arnholt, M. D	Superintendent of health.
Norfolk	Victor L. Siman, M. D	City health officer.
North Platte	E. W. Fetter, M. D	City physician.
Omaha	Floyd H. Kinyoun, M. D	Health commissioner.
Nevada:		
Reno	John J. Sullivan, M. D	Secretary, city board of health.
New Hampshire:		
Berlin	*John C. Greenan	Health officer.
Claremont	William P. Prescott	Do.
Concord	*Donald G Barton, M. D	Sanitary officer.
Dover	*George E. Brennan	Health officer.
Keene	*Evan Carpenter White	Do.
Laconia	E J. Gage, M. D	Secretary, board of health.
Manchester	*Howard A. Streeter, M. D	Health officer.
Nashua	Oswald S. Maynard, M. D	Chairman, board of health.
Portsmouth	George A. Fredick, M. D	Health officer.
Rochester	Charles E. Goodwin	Do.
New Jersey:		
Asbury Park	*Budd H. Obert	Health officer and registrar of vital statistics.
Atlantic City	Samuel L. Salasin, M. D	Health officer.
Bayonne	William W. Brooke, M. D	Do.
Belleville	*Eugene T. Berry	Do.
Bloomfield	*Joseph C. Saile, Ph. G., D. V. S., D. O.	Do.
Bridgeton	*John G. Robbins	Health and plumbing inspector.
Burlington	*Harold T. Blinn	Executive officer.
Camden	*Arthur L. Stone, M. D	Director of public health.
Carteret		
Cliffside Park	Frederick J. Dyer	Health officer.
Clifton	Lester F Meloney, M. D	Do.
Collingswood	Harold K Eynon, M. D	Do.
Dover	*John G. Taylor	Do.
East Orange	*Frank J Osborne, B. S. in P. H	Health officer and registrar.
Elizabeth	*Louis J. Richards, S. B. in S. E	Health officer.
Englewood	*Hugh B. Martin, M. S. C. E	Do.
Garfield	Charles B. Bleasby, M. D	Do.
Gloucester City	J. Alonzo Beek, M D	Do.
Hackensack	*L Van D Chandler	Do.
Harrison	*John T. McClure	Do.
Hawthorne	T. J. Emberton Holmes, M. D	Sanitary inspector.
Hoboken	Joseph F. X Stack, M. D	Commissioner of health.
Irvington	*William S. Bailey	Health officer.
Jersey City	*James J. Hagan	Do.
Kearny	*Amos Field, Jr	Do.
Linden	*Maldie E. Noe	Do.
Lodi	Henry H. Brevoort, M. D	Do.
Long Branch	*R. C. Errickson	Do.
Millville	Richard H. Knowles, Ph. G	Do.
Montclair	*Carl T. Pomeroy, C. P. H	Do.
Morristown	*John F. Kilkenny	Do.
New Brunswick	Edwin J. Cronk, M. D	City health officer.
Newark	*Charles V. Craster, M. D., D. P. H	Health officer.
Nutley	*Richard V. Fellers	Do.
Orange	W. M. Brien, M. D	Health officer and registrar of vital statistics.
Passaic	John N. Ryan, M. D	Health officer.
Paterson	*Frederick P. Lee, M. D	Do.
Perth Amboy	*Charles S. Thompson, D. V. S	Health officer.
Phillipsburg	William Dana Pursel, D. D. S., M. D.	Town physician.
Plainfield	*Andrew J. Krog	Health officer.
Pleasantville	Robert M. Grier, M. D	Health inspector.
Rahway	*Fred M. Williams	Health officer and registrar of vital statistics.
Red Bank	Wm. H. Lawes, D. V. S	Sanitary inspector.
Ridgefield Park	William F. Reynolds, D. V. M	Health officer.
Ridgewood	Joseph F. Benjamin, M. D	Do.

City	Name of health officer	Official title
New Jersey—Contd.		
Roselle	Perry A. Proudfoot, M. D	Health officer.
Rutherford	*Marine Dunn	Do.
South Orange	A C Benedict, M D	Do.
South River	A. A. Pansey, M. D.	Health inspector.
Summit	Henry P. Dengler, M. D	Executive officer.
Trenton	*Alton S. Fell, M. D	Health officer and director of public welfare.
Union City	Grant P Curtis, M D	Health officer.
West New York	Harry G. Eakin, Ph G., M. D	Health inspector.
West Orange	Kurt W Thum, M D.	Director of health.
Westfield	*Andrew Carney	Executive officer.
New Mexico:		
Albuquerque	*Julian O. Long, M D., C. P H	District health officer.
Roswell	*O. E Puckett, M D	Do.
Santa Fe	*F W. Parker, Jr, M. D, C P. H	Do.
New York:		
Albany	*Daniel V. O'Leary, M D	Commissioner of health.
Amsterdam	P J. Fitzgibbons, M D	Health commissioner and registrar of vital statistics.
Auburn	John W Copeland, M. D	Health officer.
Batavia	Emery F. Will, M. D.	Do
Beacon	Charles B Dugan, Ph B, M D	Do.
Binghamton	Chalmer J. Longstreet, M D	Do
Buffalo	*Francis E. Fronczak, LL. D., M. D, Dr Sc, P H	Health commissioner.
	*Edward Durney, M D	Deputy health officer.
	*Charles A Bentz, M. D	Do
Division of child hygiene	*Edward Durney, M D	Director
Communicable disease and division of laboratories	*Charles A Bentz, M D	Do
Division of vital statistics	*Wm J Winn	Registrar of vital statistics.
Division of sanitation	*Frank E Trumble	Assistant chief inspetor.
Division of smoke abatement	do	Do
Division of food inspection	*Willard B. Diebold	Do
J. N Adam Memorial Hospital (Perrysburg N Y).	Horace Lo Grasso, M D	Superintendent.
Cohoes	E M Bell, M D, P. H D	Commissioner of health.
Corning	Henry E Elwood, Jr, M D	Health officer
Cortland	*Merle R French, M D	Commissioner of health.
Dunkirk	Edgar Bieber, M. D	Health officer.
Elmira	Reeve B Howland, M D	Do
Endicott	John M. Mallory, M D	Do
Floral Park	Arthur E Goldfarb, M D	Do.
Freeport	William H Runcie, M D	Do
Fulton	Harold F McGovern, M. D	Health officer and city physician.
Geneva	C. W. Grove, M D	Health officer.
Glen Cove	Joseph B Conolly, M D	Do.
Glens Falls	*Virgil D Selleck, M D, C P H	Do.
Gloversville	A. L Johnson, M D	Do.
Hempstead	William H Runcie, M. D	Do.
Herkimer	James W. Graves, M D	Do.
Hornell	George E Taylor, M D	Do
Hudson	*Louis Van Hoesen, M D	Commissioner of health
Ithaca	*Lewell T Genung, M D	Health officer
Jamestown	William M Sill, M D	Superintendent of public health.
Johnson City	Walter J Farrell, Phar D., M D	Health officer.
Johnstown	Guy Vail Wilson, M. D	Commissioner of public health and welfare
Kenmore	E. R. Linklater, M D	Health officer.
Kingston	Lester E Sanford, M D	Do.
Lackawanna	A S Culkowski, M D	Do.
Little Falls	A. B Santry, M. D	Do.
Lockport	Lyman H. Wheeler, M D	Health officer and city physician.
Lynbrook	F. Maxwell Galloway, M D	Health officer.
Mamaroneck	Edward M. Clark, M D	Do.
Massena	C. E Elkins, M D	Do.
Middletown	*Hilton J Shelley, M D	Do.
Mount Vernon	*F. W. Shipman, M. D	Commissioner of public health.
New Rochelle	*Bertrand F Drake, M. D., Dr P H	Health officer.
New York	*John L. Rice, M. D	Commissioner of health.
	*William H. Best, M D	Deputy commissioner of health.
	*George T. Palmer, Dr. P. H	Do.
	*Sol Pincus, C. E	Do.
Bureau:		
General Administration.	*Maurice G. Postley	Secretary.
Records	*Thomas J. Duffield	Registrar of records.

City	Name of health officer	Official title
New York—Continued		
New York—Continued		
Bureau—Continued		
Sanitation	*John Oberwager, M. D	Director.
Preventable Diseases.	*Samuel Frant, M. D	Epidemiologist.
Child Hygiene	*Jules Blumenthal, M D., Dr. P. H.	Director.
School Hygiene	*Elwood S. Morton, M. D	Do.
Nursing	*Miss Amelia H. Grant, R N	Do.
Public health education.	*Charles F. Bolduan, M. D	Do.
Laboratories	*Ralph S. Muckenfuss, M. D	Do.
Food and Drugs	*Abraham Lichterman	Acting director.
District health administration.	*Margaret W. Barnard, M. D., Dr. P. H	Director.
Tuberculosis	*Herbert R Edwards, M D	Do.
Social hygiene	*Theodore L Rosenthal, M D	Do.
Newburgh	Thomas J. Burke, M D	Health officer.
Niagara Falls	Edward E. Gillick, M. D	Do.
North Tonawanda	Henry C. Lapp, M. D	Do
Ogdensburg	Frederick E. Clark, M D	Do.
Olean	John A. Johnson, M D	Health commissioner.
Oneida	Edmund L Finley, M. D	Health officer.
Oneonta	E P. Hall, M D	Do.
Ossining	Robert R. Bloom, M. D	Do.
Oswego	James E. Mansfield, M. D	Do.
Peekskill	J. Douglas Barry, M. D	Do.
Plattsburg	Leo F. Schiff, M. D	Do.
Port Chester	William J. Sheehan, M. D	Do.
Port Jervis	G. Otto Pobe, M. D	Do.
Poughkeepsie		
Rensselaer		
Rochester	*Arthur M. Johnson, M D	Health officer.
Rockville Centre	*Bruce B. Preas, M. D	Do.
Rome	Lewis N Eames, M D	Do.
Saratoga Springs	Frederic J. Resseguie, M D	Do.
Schenectady	*William C. Treder, M. D	Commissioner of health.
Syracuse	*Gregory D. Mahar, M. D	Do.
Tonawanda	Russell H. Wilcox, M D	Health officer.
Troy	James H. Flynn, M. D	Commissioner of health.
Utica	*Hugh H Shaw, M. D	Health officer.
Valley Stream	John M Quinn, M. D	Do.
Watertown	George B. Van Doren, M. D	Do.
Watervliet	Charles A. Birmingham, M. D	Do.
White Plains	*Matthias Nicoll, Jr, M D	County commissioner of health.
Yonkers	*Eugene F. McGillian, M. D., M. S. in P. H.	Commissioner of health.
North Carolina:		
Asheville	*John W. Williams, M. D, C. P. H.	Health officer.
Charlotte	*G. L. Rea, M. D	Commissioner of health.
Concord	*Daniel G Caldwell, M. D	County health officer
Durham	*Jesse H Epperson	Superintendent of health.
Elizabeth City	Thomas S. McMullan, M. D	Municipal health officer.
Fayetteville	*Malcolm T. Foster, M. D., C. P. H.	County health officer.
Gastonia	L. N. Patrick, Phar D, M. D	City health officer.
Goldsboro	*Samuel B McPheeters, M. D., C P. H	Director of public health.
Greensboro	*C Curtis Anderson, M. D	Health officer.
High Point	*R. A. Herring, M. D	Director of health.
Kinston	*Z. V. Moseley, M. D	County health officer.
New Bern	*John S. Anderson, M D	Do.
Raleigh	*A. C. Bulla, M D	Do.
Rocky Mount	*J. Allen Whitaker, M. D	Superintendent, city health department.
Salisbury	*Charles W. Armstrong, M. D	Health officer.
Shelby	H. C. Thompson, M. D	County physician and quarantine officer.
Statesville		
Thomasville		
Wilmington	*A. H. Elliot, M. D	County health officer.
Wilson	*W. H. Anderson, M. D	Health officer.
Winston-Salem	*R. L. Carlton, M. D	City health officer.
North Dakota:		
Bismarck	Albert M. Fisher, M. D	Do.
Fargo	*H J. Skarshaug, M. D	City health officer.
Grand Forks	E. C. Haagensen, M. D	Health officer.
Minot	J. L. Devine, M. D	City health officer.
Ohio:		
Akron	* Melville D. Ailes, LL.B., M. D	Director of health.
Alliance	G. O. Rowland, M. D	Health commissioner.
Ashland	Robert P. Bogniard, M. D	Director of welfare.
Ashtabula	James H. Park, M. D	Health officer.
Barberton	H. A. Finefrock, M. D	Health commissioner.
Bellaire	William J. Shepard, M. D	Do.
Bucyrus	*W. G. Carlisle, M. D	Do.
Cambridge	Carl M. Oshe	City health commissioner.
Campbell	James S. Mariner, M. D	Health commissioner.

City	Name of health officer	Official title
Ohio—Continued		
Canton	Frank M. Sayre, M D	Health commissioner.
Chillicothe	*Raymond E Bower, Ph B, M. D.	Do.
Cincinnati	*F. K. Harder, M D	Acting health commissioner.
Cleveland	*Harold J. Knapp, M. D.	Commissioner.
Division:		
Communicable diseases.	*T. G. Duncan, M D	Chief.
Venereal diseases	E J Braun, M. D.	Do
Tuberculosis	E. P Edwards, M D	Do.
Child hygiene	*R J Ochsner, M D	Do.
School health service.	*J G. Smith, M D	Do.
Food and Drug administration	*E B. Buchanan	Do.
Laboratories	Emerson Megrail, M D	Consulting laboratory director.
	*Wm H Hay, LL B	Chief of laboratories
Public health nurses	*Cora M Templeton, R N	Director
Vital statistics	*Sara B Hartley	Chief
Cleveland Heights	*Robert Lockhart, M D	County health officer
Columbus	*Nelson C Dysart, Ph C, M D	Health commissioner.
Coshocton	J. D Lower, M. D	Do
Cuyahoga Falls	*R H Markwith, M. D.	Commissioner of health.
Dayton	A O Peters, M D	Do.
East Cleveland	George W Stober, M D	Director of health
East Liverpool	Roy C Costello, M D	Health commissioner.
Elyria	George E French, M D.	Do
Euclid	William Baeckler	Safety director
Findlay	*Martha Laffey, R N	Health commissioner.
Fostoria	*H A DeVore	Do
Fremont	E. L. Vermilya, M D	Do
Garfield Heights	*J. A Doull, M D, D P H	Acting county health commissioner.
Hamilton	*C J Baldridge, B L, M D	Health commissioner.
Ironton	*Harry Sherwood Allen, M D	Do.
Lakewood	Wallace J Benner, M D	Do.
Lancaster	Clifford B Snider, B S in Agr, M D	Do
Lima	James B Poling, M D	Do
Lorain	Valloyd Adair, M D	Do
Mansfield	*Roy C Rehder, M D	Do.
Marietta	F S McGee, M D	Do.
Marion	M M Weinbaum, M D	Do.
Martins Ferry	*John Donovan	Do
Massillon	*Dwight L Fisher	Do.
Middletown	*George D Lummis, M D	Do
New Philadelphia	*Joseph Blickensderfer, M D.	Do.
Newark	W H Knauss, M D.	Do
Niles	W A Werner, M D	Do
Norwood	*R E Hatfield, M D	Commissioner of health.
Painesville	*Clara Carter Wilder, R N.	Health commissioner.
Parma	Robert Lockhart, M D	County health officer.
Piqua	F Robert Buechner	Health commissioner.
Portsmouth	Oral D Tatje, M D	Do
Salem	Raymond T Holzbach, M D	Do.
Sandusky	*F M Houghtaling, M D	Do
Shaker Heights	Paul M Spurney, M D	Director of health
Springfield	*Oscar M Craven, M D	Director of public health.
Steubenville	*Julius A Pizzoferrato	Health commissioner
Struthers	*Henry M Crowe	Sanitary officer
Tiffin	J A Gosling, M D	Health commissioner
Toledo	*Millard C. Hanson, M. D., Dr P H.	Director of health.
Warren	M T Knappenberger, M D	Health commissioner
Wooster	*John J Suttor, M. D	Do.
Xenia	A. D. DeHaven, M D	Do.
Youngstown	Wallace W. Ryall, M D	Commissioner of health
Zanesville	D. G. Candy, M. D	Superintendent of health and sanitation.
Oklahoma:		
Ada	*Glen W. McDonald, M D	Director, county health unit.
Ardmore	A Y. Easterwood, M. D	City physician.
Bartlesville	Elizabeth Chamberlin, M D	City superintendent of health.
Chickasha	S O Marrs, M D	City health commissioner.
Enid	R. C Baker, M. D	City superintendent of health.
Lawton	*Kenneth P. Cash	City chemist.
McAlester		
Muskogee	James T. Nichols	City superintendent of health.
Oklahoma City	Walter H. Miles, M. D	Director of health.
Okmulgee		
Ponca City	*Charles C. Gardner, M. D	City health director.
Sapulpa		
Seminole	*George Hunter, M. D	County superintendent of health.
Shawnee	T. D. Rowland, M. D	City physician.
Tulsa	J. Jeff Billington, M. D	Superintendent of health.
Wewoka	*George Hunter, M. D	County superintendent of health.

City	Name of health officer	Official title
Oregon:		
Astoria	Nellie S. Vernon, M. D	City health officer.
Eugene	*Elsworth L. Gardner, M. D	City and county health officer.
Klamath Falls	*Neil Black, M. D	County health officer.
Medford	L. D. Inskeep, M. D	City health officer.
Portland	*Adolph Weinzirl, M D , C. P. H	Health officer.
Salem	*Vernon A. Douglas, M. D., C. P. H	City and county health officer.
Pennsylvania:		
Aliquippa	*J. E Tanner	Health officer.
Allentown	*J Treichler Butz, D D. S., M. D	Do.
Altoona	*Raymond A Herbert	Superintendent of health.
Ambridge	*Louis Herrmann	Health officer.
Arnold	William G. Ihrig	Do.
Beaver Falls	*H B Plummer	Do.
Bellevue	*Mrs G. P Brown	Do.
Berwick		
Bethlehem	Francis J. Conahan, M. D.	City physician.
Braddock	*Samuel J. Escher	Health officer.
Bradford	*R G Vogel	Do.
Bristol	John M. Wright	Do.
Butler	*Edgar L. Geibel	Do.
Canonsburg	*Frank Milligan	Do.
Carbondale	*Arthur J. Dearie	Do.
Carlisle		
Carnegie	*George W. Schaffer	Do.
Chambersburg	*Frank J. Croft	City health officer.
Charleroi	*J. M. Hill	Health officer and inspector.
Chester		
Clairton	*W F Connelly	Health officer.
Coatesville	Charles V Peace, V M D	Do.
Columbia	G. M Rodenhauser	Do.
Connellsville	*Charles H. Balsley	Do.
Conshohocken	Thomas S White	Health officer and secretary.
Coraopolis	*D K. Clever, M D	Health officer.
Dickson City	Joseph Malinoski	Secretary, board of health.
Donora	*Herman Lang	Health officer.
Dormont		
Du Bois	J. I Brockbank, M. D	Do
Dunmore	William Ferrese	Do
Duquesne	*Francis P. Long	Sanitary police officer.
Easton	R S Raub, M. D	Health officer
Ellwood City	*Lewis Young	Do
Erie	*James R Smith, M. D	Do.
Farrell	*Ben F. Davis	Do
Franklin		
Greensburg	*Joseph B Cherry	Health officer and secretary.
Hanover	Nevin H. Seitz, M D	Secretary, board of health.
Harrisburg	John M. J Raunick, M. D	Health officer
Hazleton	*William Pfaff	Do.
Homestead		
Jeannette	*Charles E Walter	Chief health officer.
Johnstown	L. L Porch, M D	City physician.
Kingston	*J F Seward	Health officer
Lancaster	*Benjamin F Charles	Do
Latrobe	W T Osborne	Do
Lebanon	C Ray Bell, M D	City health officer.
Lewistown	H E Fetterolf	Health officer.
McKeesport	*Daniel F. Marsh	Do.
McKees Rocks	*John Driscoll	Do.
Mahanoy City	*William Walker	Do.
Meadville	*John Laley	Do.
Monessen	*Francis C. Duvall, M D	Do.
Mount Carmel	*Howard Zieger	Do.
Munhall	*Henry Gillard	Do.
Nanticoke	*H. Judd Abbott	Do.
New Castle	William L Steen, M D	Health officer.
New Kensington	*John H. Eraus	Do.
Norristown	*J. Cleve Cassel	Do.
North Braddock	*Michael J. Pastor	Do.
Oil City	*William J. Lewis	Do.
Old Forge		
Olyphant	Andrew Toras	Do.
Philadelphia:		
Department of public health.	*Wm. C. Hunsicker, M. D	Director, department of public health.
	*Alfred F. Allman, M. D	Assistant Director, department of public health.
Bureau of health	*William J. Wolf	Secretary.
Bureau of hospitals:		
Philadelphia General Hospital, 34th and Pine Streets.	*William G. Turnbull, M. D	Superintendent.

City	Name of health officer	Official title
Pennsylvania—Contd.		
Philadelphia—Contd.		
Bureau of hospitals—Continued		
Philadelphia Hospital for Contagious Diseases, 2d and Luzerne Sts.	*Pascal F. Lucchesi, M. D	Superintendent.
Philadelphia Hospital for Mental Diseases, Byberry.	*Wilbur P. Rickert, M. D	Do.
Phoenixville	*Russell E Deery	Health officer.
Pittsburgh	*I. Hope Alexander, M. D	Director.
Bureau of infectious diseases (including municipal and tuberculosis hospitals).	*P. E. Marks, M. D	Superintendent.
Bureau of sanitation	*George W. Schusler, C. E	Do.
Bureau of child welfare.	*H. J. Benz, M. D	Do.
Bureau of food inspection.	*Howard Patton	Do.
Bureau of smoke regulation.	H. B. Meller, C. E	Do.
Pittston	*Michael A McHale	Health officer.
Plymouth	H. G Templeton, M. D	Do.
Pottstown	*A. John André	Do.
Pottsville	*A. C. Huntzinger	Do.
Reading	*Ira J. Hain, M. D	Do.
Scranton	Arthur E Davis, M. D	Director, department of health.
Shamokin	*Frederick Zeiser	Officer, board of health.
Sharon	*Joseph S Hildebrand	Sanitary officer.
Shenandoah	*Charles Bell	Health officer.
Steelton	*E. G Butler	Do.
Sunbury	*Carl P. Inkrote	Do.
Swissvale	*Samuel L. Glasgow	Do.
Tamaqua	Lamont Perrine	Do.
Taylor	E. E Edwards, M. D	Do.
Turtle Creek	*Manuel Emmanuel	Do.
Uniontown	*J. R West	Do.
Vandergrift	J. D Remaley	Do.
Warren	*Ralph N Brown	Do.
Washington	*C. E. Houston	Do.
Waynesboro	Mrs. Verne L. Snowberger	Do.
West Chester	Warren T. Garrett	Do.
Wilkes-Barre	*Jacques P. Gray, M. D , M. P. H	Do.
Wilkinsburg	*J. M Snyder	Do.
Williamsport	*William J. Mollenkopf	Do.
York	John D. Yeagley, M D	Director of public health.
Rhode Island:		
Bristol	Matthew G. Mactozo	City health officer.
Central Falls	Omer H. Masse, M. D	City physician.
Cranston	Daniel S. Latham, M. D	Superintendent of health.
Cumberland	Stephen A. Kenny, M D, Valley Falls	Health officer.
East Providence	William H. T. Hamill, M. D	Do.
Newport	Edward V. Murphy, M. D	Commissioner of health.
North Providence	Joseph A. St. Angelo, Ph. G., M. D	Chief health officer.
Pawtucket	Albert L. Vandale, M. D	Superintendent of health.
Providence	*Michael J. Nestor, M. D	Do.
Warwick	*William H. Dyer, M. D	Do.
Westerly	Samuel C. Webster, Ph. G., M. D	Do.
Woonsocket	James P. O'Brien, M. D., C. P. H	Health officer.
South Carolina:		
Anderson	*Goodman Bare, M. D	County health director.
Charleston	*Leon Banov, M. D	Do.
Columbia	P. E. Payne, M. D	City health officer.
Florence	*George D. Heath, M. D., Dr. P. H	Health commissioner.
Greenville	*Irving Sydnor Barksdale, M. D	Commissioner of health.
Greenwod	*Joseph E. Brodie, M. D	County health officer.
Rock Hill	Roy D. Sumner, M. D	City physician.
Spartanburg	*W. O. Wrightson, M. D	Health officer.
Sumter	*George R. Kitchen, D. V. M	City health officer.
South Dakota:		
Aberdeen	J. F. Adams, M. D	Do.
Huron	T. J. Wood, M. D	Health officer.
Mitchell	E. M. Young, M. D	City health officer.
Rapid City	*H. D. Lien, M. D	Director, county health unit.
Sioux Falls	Emil G. Ericksen, M. D	Health officer.
Watertown		

City	Name of health officer	Official title
Tennessee:		
Bristol	*F. L. Moore, M. D., C. P. H.	County health officer.
Chattanooga	John W. L Cooper, M. D	Director of health.
Jackson	Herman Hawkins, M. D	City health officer.
Johnson City	*E. E. Carrier, M. D	Director, city health department.
Kingsport	*F. L. Moore, M. D., C. P. H	County health officer.
Knoxville	*William H Enneis, M. D., M. P. H.	City health officer.
Memphis	*Lloyd M. Graves, M. D	Superintendent of health.
Nashville	*John Overton, M. D	City health officer.
Texas		
Abilene		
Amarillo	*B. M. Primer, M. D., M. P. H	Director of health unit.
Austin	*Banner Gregg, M. D	City health officer.
Beaumont	W. W. Dunn, M. D	Do.
Big Spring	M. H. Bennett, M. D	Do.
Brownsville	Thurman Archer Kinder, Jr., M. D	Do.
Brownwood	J. M. Horn, M. D	Do.
Cleburne	Joseph M. Stallcup, M. D	Do.
Corpus Christi		
Corsicana	William T Shell, Jr., M. D	Do.
Dallas	*James W Bass, M. D	Director of public health.
Del Rio	D. A York, M. D	City health officer.
Denison	William A. Lee, M. D	Do.
El Paso	*John W Tappan, M. D	Director, county health unit.
Fort Worth	*Arthur Heath Flickwir, M. D	Director of public health and welfare.
Galveston	Walter Kleberg, M. D	City health officer.
Greenville	John S. Cooper, M. D	Do.
Harlingen	V. M. Bass, M. D	Do.
Houston	*John W. Brown, M. D., C. P. H	Director of public health.
Laredo	Albert Thos Cook, M. D	City health officer.
Lubbock	J. W. Rollo, M. D	Do.
Marshall	W. H. Bennett, M. D	City health officer and food inspector.
Palestine	John M. Colley, M. D	City health officer.
Pampa	K. L. Buckner, M. D	Do.
Paris	John A. Stephens, M. D	Do.
Port Arthur	Frank J Beyt, M. D	Do.
San Angelo	Brian T. Brown, M. D	Do.
San Antonio	*W. A. King, M. D	Do.
San Benito		
Sherman	B A. Russell, M. D	County health officer.
Sweetwater	*George A. Gray, M. D	City health officer.
Temple	*E W Prothro, M D	Director, county health unit.
Texarkana	Charles A. Smith, M. D	City health officer.
Tyler	Albert Woldert, Ph. G., M. D	Do.
Waco	*George M. Liddell, M. D	Do.
Wichita Falls	*John H. Fletcher, M. D	Do.
Utah:		
Ogden	W. J Wilson, M. D	City physician.
Provo	*Charles M. Smith, M. D	Do.
Salt Lake City	T J. Howells, M. D	Health commissioner.
Vermont:		
Barre	J. J. Tomasi, M. D	City health officer.
Bennington	*Joseph M. Ayres	Do.
Burlington	Erald F. Foster, M. D	Do.
Rutland	*Clare M. Cole	Health officer.
Virginia:		
Alexandria	W. Lewis Schafer, M. D	Health officer and clinician.
Charlottesville	*Robert D Hollowell, M. D	City-county health officer.
Danville	*R. W. Garnett, M. D	Health officer and director of public welfare.
Hopewell	L. A Sims	Acting city engineer.
Lynchburg	*Mosby G Perrow	Director of public welfare.
Newport News	*G Colbert Tyler, M. D	Health officer.
Norfolk	*John C Sleet, M. D	Health commissioner.
Petersburg	Mason Romaine, M. D	Health officer.
Portsmouth	*L. H Denny, M. D	Director of public welfare.
Richmond	*W. Brownley Foster, M D	Do
Roanoke	*Coleman B. Ransone, M. D	Health officer.
Staunton	C. W. Rodgers, M. D	Do.
Suffolk	*Charles C. Hedges, M. D	Do.
Winchester	L. M. Allen, M. D	Do.
Washington:		
Aberdeen	B. O. Swinehart, M. D	City health officer.
Bellingham		
Bremerton	David H. Polk, M. D	Do.
Everett	J. Walter Darrough, M. D	Do.
Hoquiam	Harry C. Watkins, M. D	Do.
Longview	J S. McCarthy, M. D	Do.
Olympia	*Sanford Lehman, M. D	City-county health officer.
Port Angeles	*Leland E. Powers, M. D	Do.
Seattle	*Frank M. Carroll, M. D	Commissioner of health.
Spokane	*Ralph Hendricks, M. D	Commissioner of public affairs and health officer.
Tacoma	S. M. Creswell, M. D	Director of health.
Vancouver	*J. A. Kahl, M. D	City and county health officer.
Walla Walla	*Alfred Ernest Eyres, M. D	City and county director of health.

City	Name of health officer	Official title
Washington—Contd.		
Wenatchee	*C. R. Fargher, M. D	City-county health officer.
Yakima	*Lloyd Moffitt, M. D	Do.
West Virginia:		
Bluefield	*David B. Lepper, M. D., C. P. H	City health director.
Charleston	*Herbert B. Wise, M. D	Health commissioner.
Clarksburg		
Fairmont	L. N. Yost, Ph. G., M. D	County health officer.
Huntington	*Andy Houvouras	Sanitary inspector.
Martinsburg	*Claude A. Thomas, M. D	County health officer.
Morgantown	*Rex A. Burdette, Ph. G , M. D	City and county health director.
Moundsville	*William G. C. Hill, Ph. G., M. D	Health director.
Parkersburg	*Arthur D. Knott, M. D., D. P. H	City and county health officer.
Wheeling	*Reece M Pedicord, M. D	Do.
Wisconsin:		
Appleton	John C Troxel, M. D	Health commissioner.
Ashland	C. O. Hertzmann, M D	Do.
Beloit	Richard A. Thayer, M. D	Health officer.
Cudahy	C. D. Partridge, M. D	Health commissioner.
Eau Claire	L. H. Flynn, M. D	Health officer.
Fond du Lac	*Edward H. Pawsat, M. D	Do.
Green Bay	Henry S Atkinson, M. D	City physician and health commissioner.
Janesville	*Fred B Welch, M D	City health officer.
Kenosha	*G Windesheim, M. D	Director of health.
La Crosse	*Anthony M. Murphy	Health officer.
Madison	*F. F. Bowman, B L , M D	Do
Manitowoc	George M. Hoffman, Ph. G , M D	Health commissioner.
Marinette	J. Wm. Boren, M D	Do.
Milwaukee	*John P Koehler, M. D	Commissioner of health.
	E V. Brumbaugh, M D	Deputy commissioner of health.
School hygiene division.	*George P. Barth, M. D	Director
Division of venereal diseases	*William J McKillip, M. D	Do
Vital statistics	*George E Adams	Deputy register.
Division of tuberculosis.	*George R. Ernst, M. D	Director
Contagious disease division.	*Edward R Krumbiegel, M. D	Do.
Division of food and sanitary inspection	*Stanley L. Pilgrim, M. D. C	Do
Bureau of laboratories.	*R W. Cunliffe	Do
Division of child welfare.	*E. V. Brumbaugh, M. D	Do.
Division of nurses	*Alma H. Brunk, R. N	Do.
Oshkosh	*Irvin A. Ihrke, M. D	Health commissioner.
Racine	*I F Thompson, M D , M. P. H	Commissioner of health.
Sheboygan	*Gustav J Hildebrand, M D	Commissioner of public health.
Shorewood	Jerome M Jekel, M D	Health officer.
South Milwaukee	R D. Moray, M. D	Health commissioner.
Stevens Point	Ferdinand R Krembs, M. D	Health officer.
Superior	*Charles H. Mason, M D	Health commissioner.
Two Rivers	Alfred P. Zlatnik, M. D	Commissioner of health
Watertown	E. W. Bowen, M. D	Health commissioner.
Waukesha	Frank M. Scheele, M. D	Do
Wausau	*L. F Bugbee	Health officer.
Wauwatosa	Roy T. Hansen, M. D	Health commissioner
West Allis	*Frank H. Russell, M D	Commissioner of health.
Wyoming:		
Casper	Joseph C. Kamp, M. D	County health officer.
Cheyenne	W. R Day, M D	County health physician.

DEATHS DURING WEEK ENDED NOVEMBER 20, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov 20, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	8,093	8,208
Average for 3 prior years	7,896	
Total deaths, first 46 weeks of year	393,980	394,881
Deaths under 1 year of age	507	490
Average for 3 prior years	539	
Deaths under 1 year of age, first 46 weeks of year	25,323	25,568
Data from industrial insurance companies:		
Policies in force	69,958,169	68,670,288
Number of death claims	13,583	13,263
Death claims per 1,000 policies in force, annual rate	10.1	10.1
Death claims per 1,000 policies, first 46 weeks of year, annual rate	9.7	9.8

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (------) indicate that cases or deaths may have occurred although none was reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 27, 1937, and Nov. 28, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 27, 1937	Week ended Nov. 28, 1936	Week ended Nov. 27, 1937	Week ended Nov. 28, 1936	Week ended Nov. 27, 1937	Week ended Nov. 28, 1936	Week ended Nov. 27, 1937	Week ended Nov. 28, 1936
New England States:								
Maine	------	2	2	9	37	11	0	0
New Hampshire	------	3	------	------	28	1	0	0
Vermont	1	------	------	------	64	1	0	0
Massachusetts	1	5	------	------	63	158	1	3
Rhode Island	------	3	------	------	4	94	1	0
Connecticut	12	1	5	1	3	43	1	0
Middle Atlantic States:								
New York	30	27	[1] 14	[1] 11	85	120	3	12
New Jersey	9	18	7	14	188	31	1	2
Pennsylvania	38	36	------	------	1,351	37	1	3
East North Central States:								
Ohio	36	41	26	28	230	12	1	26
Indiana	25	19	14	8	46	7	3	1
Illinois	64	36	12	9	340	13	1	5
Michigan	18	36	1	2	93	31	3	4
Wisconsin	5	3	41	12	34	20	0	2
West North Central States:								
Minnesota	4	12	1	1	7	7	1	2
Iowa	2	------	2	1	7	5	0	0
Missouri	47	28	25	90	604	6	0	7
North Dakota	------	1	------	50	5	------	1	0
South Dakota	1	1	------	------	------	3	0	0
Nebraska	7	4	------	------	2	1	0	0
Kansas	6	11	2	1	17	5	1	2
South Atlantic States:								
Delaware	------	2	------	------	1	2	0	0
Maryland [3]	23	16	5	9	6	75	2	3
District of Columbia	6	14	1	1	1	2	0	0
Virginia	35	55	------	------	63	34	6	8
West Virginia	13	20	23	20	40	------	1	5
North Carolina [3 4]	69	100	6	12	221	41	2	4
South Carolina [3]	9	21	238	213	11	17	1	4
Georgia [3]	20	39	------	------	------	------	4	0
Florida [3]	44	9	7	3	15	------	2	0
East South Central States:								
Kentucky	15	11	9	17	73	4	1	8
Tennessee [3]	21	43	66	63	110	7	6	2
Alabama [3]	29	44	81	104	8	1	7	2
Mississippi [3]	11	12	------	------	------	------	1	0

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 27, 1937, and Nov. 28, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Nov. 27, 1937	Week ended Nov. 28, 1936	Week ended Nov. 27, 1937	Week ended Nov. 28, 1936	Week ended Nov. 27, 1937	Week ended Nov. 28, 1936	Week ended Nov. 27, 1937	Week ended Nov. 28, 1936
West South Central States:								
Arkansas	18	4	46	18	8	-------	0	0
Louisiana	23	12	6	16	-------	3	0	1
Oklahoma [4]	13	15	47	66	1	7	3	3
Texas [3]	49	62	250	109	23	25	2	1
Mountain States:								
Montana	-------	1	-------	3	14	4	0	1
Idaho	1	5	3	4	2	63	1	3
Wyoming	-------	-------	-------	-------	-------	1	0	0
Colorado	17	10	-------	-------	39	6	1	0
New Mexico	7	3	1	1	86	31	0	0
Arizona	8	8	101	56	13	-------	0	0
Utah [2]	9	-------	-------	-------	15	8	0	0
Pacific States:								
Washington	7	-------	-------	3	9	11	2	2
Oregon	10	-------	21	30	9	11	0	2
California [3]	26	59	33	65	40	26	7	6
Total	789	852	1,096	1,050	4,016	985	68	124
First 47 weeks of year	24,507	25,048	283,149	148,052	264,309	274,781	4,998	6,857

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Nov. 27, 1937	Week ended Nov. 28, 1936	Week ended Nov. 27, 1937	Week ended Nov. 28, 1936	Week ended Nov. 27, 1937	Week ended Nov. 28, 1936	Week ended Nov. 27, 1937	Week ended Nov. 28, 1936	Week ended Nov. 27, 1937
New England States:									
Maine	1	1	19	18	0	0	1	0	39
New Hampshire	0	0	5	14	0	0	0	0	1
Vermont	0	0	10	9	0	0	0	0	72
Massachusetts	0	0	163	144	0	0	9	1	125
Rhode Island	0	0	28	25	0	0	0	2	51
Connecticut	0	0	39	32	0	0	1	2	31
Middle Atlantic States:									
New York	7	3	259	310	0	0	6	9	346
New Jersey	0	0	39	74	0	0	1	4	82
Pennsylvania	2	7	349	296	0	0	16	16	-------
East North Central States:									
Ohio	1	9	375	343	0	2	9	15	122
Indiana	0	3	141	80	21	1	3	0	34
Illinois	2	8	411	342	6	0	6	14	71
Michigan	3	2	340	191	0	0	3	4	138
Wisconsin	1	0	165	232	1	5	2	2	163
West North Central States:									
Minnesota	2	1	102	176	11	1	0	0	77
Iowa	0	4	203	71	58	5	1	1	33
Missouri	5	2	169	94	5	6	13	19	32
North Dakota	0	0	20	85	19	16	2	1	22
South Dakota	1	0	26	45	1	1	0	1	13
Nebraska	0	0	15	51	0	4	0	0	7
Kansas	1	2	125	164	1	12	8	3	47
South Atlantic States:									
Delaware	0	0	9	8	0	0	0	0	3
Maryland [2]	0	0	50	59	0	0	7	6	68
District of Columbia	0	0	11	12	0	0	0	0	5
Virginia	0	4	35	54	0	0	4	8	40
West Virginia	1	1	104	52	0	0	5	9	60
North Carolina [3,4]	1	1	54	82	0	0	11	13	167
South Carolina [3]	0	0	4	10	0	0	0	0	27
Georgia [3]	0	7	18	44	2	0	9	6	4
Florida [3]	0	2	10	10	1	0	1	1	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Nov. 27, 1937, and Nov. 28, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Nov. 27, 1937	Week ended Nov. 28, 1936	Week ended Nov 27, 1937	Week ended Nov 28, 1936	Week ended Nov. 27, 1937	Week ended Nov. 28, 1936	Week ended Nov. 27, 1937	Week ended Nov. 28, 1936	Week ended Nov 27, 1937
East South Central States:									
Kentucky	0	2	69	34	4	0	3	8	61
Tennessee [3]	2	5	54	67	3	0	4	4	45
Alabama [3]	2	0	21	27	1	0	6	18	17
Mississippi [2]	6	4	17	24	2	0	8	14	-------
West South Central States:									
Arkansas	3	1	38	7	17	1	3	4	13
Louisiana	2	5	8	9	0	0	0	14	3
Oklahoma [5]	0	11	56	14	4	2	9	8	28
Texas [3]	2	4	91	85	0	1	31	9	163
Mountain States:									
Montana	0	0	29	56	35	30	3	1	19
Idaho	0	1	24	23	13	1	0	4	16
Wyoming	0	0	10	8	4	0	0	0	6
Colorado	2	0	43	34	8	2	1	0	9
New Mexico	0	0	26	16	0	0	5	2	51
Arizona	0	0	10	37	0	0	0	3	-------
Utah [2]	1	0	52	20	0	0	1	0	18
Pacific States:									
Washington	2	2	32	50	31	0	2	1	73
Oregon	0	2	34	41	3	40	0	4	18
California [3]	11	9	136	217	4	5	6	15	279
Total	60	103	4,048	3,896	255	135	201	246	2,700
First 47 weeks of year	9,248	4,272	199,748	210,273	9,571	6,660	14,321	13,756	-------

[1] New York City only

[2] Week ended earlier than Saturday.

[3] Typhus fever, week ended Nov 27, 1937, 56 cases, as follows North Carolina, 8, South Carolina, 3; Georgia, 17; Florida, 4; Tennessee, 8, Alabama, 9, Texas, 6; California, 1

[4] Rocky Mountain spotted fever, week ended Nov 27, 1937, North Carolina, 1 case.

[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week·

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October 1937										
Arizona	0	25	141	6	18	1	3	21	1	21
Georgia	6	181	154	427	53	37	6	158	2	40
Hawaii Territory	0	10	1,226	[1] 3	52	-------	0	1	0	7
Kansas	2	50	11	3	32	-------	29	454	4	8
Louisiana	1	61	33	149	2	9	13	44	0	43
Montana	1	1	71	-------	69	-------	4	63	50	13
New Mexico	3	10	3	2	82	2	4	83	4	58
Rhode Island	5	5	-------	-------	9	-------	2	73	0	2
South Dakota	0	4	10	-------	6	-------	5	81	0	5
Washington	3	11	8	-------	46	-------	23	122	53	9
Wisconsin	2	28	116	-------	105	-------	57	374	7	6

[1] Cases off shipping.

October 1937	Cases
Anthrax:	
Georgia	1
Montana	1
Chicken pox:	
Arizona	16
Georgia	30
Hawaii Territory	55
Kansas	248
Louisiana	3
Montana	115
New Mexico	13
Rhode Island	79
South Dakota	68
Washington	295
Wisconsin	716
Conjunctivitis:	
Georgia	17
New Mexico	2
Washington	4
Dysentery:	
Arizona	40
Georgia (amoebic)	16
Georgia (bacillary)	7
Hawaii Territory (amoebic)	2
Kansas (bacillary)	1
Louisiana (amoebic)	6
Montana	4
New Mexico (amoebic)	3
New Mexico (bacillary)	2
New Mexico (unspecified)	8
Washington (bacillary)	2
Encephalitis, epidemic or lethargic:	
Arizona	2
Georgia	1
Kansas	6
Louisiana	2
Rhode Island	1
South Dakota	3
Washington	3
Wisconsin	2
Food poisoning:	
New Mexico	10
German measles:	
Arizona	3
Kansas	2
Montana	7
Washington	11
Wisconsin	38

October 1937—Con.	Cases
Hookworm disease:	
Georgia	2,640
Hawaii Territory	20
Louisiana	56
Impetigo contagiosa:	
Hawaii Territory	38
Rhode Island	14
Washington	7
Jaundice, infectious:	
Hawaii Territory	20
Leprosy:	
Hawaii Territory	6
Mumps:	
Arizona	20
Georgia	15
Hawaii Territory	27
Kansas	129
Louisiana	1
Montana	25
New Mexico	11
Rhode Island	3
South Dakota	5
Washington	229
Wisconsin	103
Ophthalmia neonatorum:	
Hawaii Territory	1
Louisiana	1
New Mexico	2
Paratyphoid fever:	
Georgia	1
Louisiana	2
Montana	5
New Mexico	1
Puerperal septicemia:	
New Mexico	2
Rabies in animals:	
Louisiana	17
Rhode Island	2
Washington	19
Rabies in man:	
Georgia	1
Louisiana	1
Scabies:	
Kansas	4
Rhode Island	1
Septic sore throat:	
Georgia	46
Hawaii Territory	1
Kansas	4
Louisiana	21

October 1937—Con.	Cases
Septic sore throat—Con.	
Montana	11
New Mexico	1
Rhode Island	1
South Dakota	1
Washington	6
Wisconsin	15
Tetanus:	
Hawaii Territory	1
Louisiana	4
New Mexico	1
Trachoma:	
Arizona	36
Georgia	1
Hawaii Territory	5
South Dakota	1
Wisconsin	2
Trichinosis:	
South Dakota	6
Tularaemia:	
Georgia	2
Kansas	2
Wisconsin	3
Typhus fever:	
Georgia	108
Hawaii Territory	4
Louisiana	7
Undulant fever:	
Georgia	2
Kansas	3
Louisiana	5
Rhode Island	1
Wisconsin	3
Vincent's infection:	
Kansas	20
Whooping cough:	
Arizona	39
Georgia	65
Hawaii Territory	8
Kansas	258
Louisiana	21
Montana	75
New Mexico	113
Rhode Island	92
South Dakota	128
Washington	184
Wisconsin	788

PLAGUE INFECTION IN FRESNO COUNTY, CALIF.

Under date of November 23, 1937, Dr. W. M. Dickie, Director of Public Health of California, reported that plague infection had been proved, by animal inoculation, in a pool of organs from six golden mantled squirrels collected on November 4 at Shaver Lake, Fresno County, Calif.

WEEKLY REPORTS FROM CITIES

City reports for week ended Nov. 20, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities											
5-year average	315	306	48	476	560	1,193	7	353	38	913	------
Current week	237	134	41	1,314	548	1,025	11	318	35	872	------
Maine:											
Portland	0	1	0	0	3	1	0	0	0	5	34
New Hampshire:											
Concord	0	------	1	0	0	0	0	0	0	0	12
Manchester	1	------	0	0	0	4	0	0	0	0	11
Nashua	0	------	------	1	------	0	0	------	0	4	8
Vermont:											
Barre	0	------	0	25	1	0	0	0	0	0	8
Burlington	0	------	0	0	0	0	0	0	0	1	9
Rutland	0	------	0	6	0	0	0	0	0	2	10
Massachusetts:											
Boston	1	------	0	44	17	38	0	14	0	21	213
Fall River	1	------	0	1	0	1	0	2	0	23	22
Springfield	0	------	0	0	0	11	0	3	0	11	34
Worcester	1	------	0	0	1	1	0	2	0	1	43
Rhode Island:											
Pawtucket	0	------	0	1	0	4	0	0	0	1	13
Providence	0	------	0	0	2	20	0	1	1	35	59
Connecticut:											
Bridgeport	0	------	0	0	0	2	0	0	0	1	29
Hartford	0	------	0	1	2	19	0	0	1	2	23
New Haven	0	3	0	0	1	5	0	1	0	0	41
New York:											
Buffalo	0	------	0	1	6	14	0	4	0	21	127
New York	24	11	3	41	80	84	0	66	5	137	1,357
Rochester	0	------	0	1	3	1	0	3	0	7	66
Syracuse	0	------	0	0	6	40	0	0	0	17	51
New Jersey:											
Camden	4	------	0	1	0	7	0	1	0	0	23
Newark	0	1	0	3	3	18	0	4	0	24	108
Trenton	0	------	0	80	4	0	0	1	0	1	41
Pennsylvania:											
Philadelphia	6	8	3	22	36	69	0	15	3	40	482
Pittsburgh	3	4	3	244	25	30	0	10	1	22	169
Reading	0	------	0	2	2	1	0	0	1	0	29
Scranton	0	------	------	5	------	0	0	------	0	0	------
Ohio:											
Cincinnati	7	------	0	2	11	17	0	6	0	4	144
Cleveland	2	7	2	47	13	48	0	6	0	33	186
Columbus	5	1	1	0	4	8	0	5	0	5	92
Toledo	0	2	2	4	3	0	0	4	3	7	66
Indiana:											
Anderson	1	------	0	0	0	7	0	1	0	3	9
Fort Wayne	1	------	0	0	3	1	0	0	0	0	22
Indianapolis	12	------	0	2	10	19	0	5	0	12	103
Muncie	1	------	0	4	1	8	1	2	0	1	14
South Bend	0	------	0	0	1	1	0	0	0	4	17
Terre Haute	0	------	0	0	0	0	0	0	0	0	12
Illinois:											
Alton	0	------	0	43	0	2	0	0	0	0	6
Chicago	21	8	7	70	35	102	0	29	2	29	700
Elgin	0	------	0	0	1	0	0	0	0	1	9
Moline	0	------	0	0	1	18	0	0	0	1	5
Springfield	0	------	0	0	1	3	0	0	0	2	16
Michigan:											
Detroit	13	1	0	52	34	113	0	17	1	52	250
Flint	5	------	0	3	3	13	2	1	0	4	22
Grand Rapids	0	------	1	1	2	28	0	0	0	5	35
Wisconsin:											
Kenosha	0	------	0	0	0	0	0	0	0	0	6
Madison	1	------	0	0	3	5	0	0	0	3	29
Milwaukee	0	------	0	49	9	11	0	2	0	20	86
Racine	0	------	0	0	0	3	0	0	0	2	11
Superior	0	------	0	1	0	3	0	0	0	1	[illegible]

City reports for week ended Nov. 20, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Minnesota:											
Duluth	0	--	0	0	1	10	0	0	0	4	28
Minneapolis	1	--	0	3	3	27	0	0	1	10	94
St. Paul	0	--	0	0	4	5	0	2	0	8	63
Iowa:											
Cedar Rapids	0	--	--	0	--	0	0	--	0	2	--
Davenport	1	--	--	0	--	2	0	--	0	0	--
Des Moines	1	--	--	0	--	23	2	--	0	0	27
Sioux City	0	--	0	1	--	3	1	--	0	1	--
Waterloo	0	--	--	0	--	4	0	--	0	3	--
Missouri:											
Kansas City	1	--	0	1	11	15	0	5	0	4	94
St. Joseph	5	--	0	1	2	6	1	1		0	20
St. Louis	20	--	0	536	18	36	0	7	0	13	193
North Dakota:											
Fargo	0	--	0	0	3	1	0	0	0	7	15
Grand Forks	1	--	--	0	--	10	1	--	0	0	--
Minot	0	--	0	0	0	0	1	0	0	7	5
South Dakota:											
Aberdeen	2		--	0	--	9	0	--	0	3	--
Nebraska:											
Omaha	0	--	0	1	4	1	0	1	0	1	56
Kansas:											
Topeka	0	--	0	0	5	3	0	0	0	6	20
Wichita	0	--	0	2	2	3	0	0	0	1	21
Delaware:											
Wilmington	0	--	0	0	3	12	0	0	0	4	30
Maryland:											
Baltimore	17	3	1	1	20	22	0	12	2	55	199
Cumberland	0	--	0	0	0	0	0	1	0	0	20
Frederick	0	--	0	0	0	0	0	0	0	0	5
Dist. of Col.:											
Washington	5	--	0	5	11	19	0	10	0	5	145
Virginia:											
Lynchburg	3	--	1	0	0	2	0	0	0	1	14
Norfolk	3	--	0	6	0	3	0	3	0	0	24
Richmond	3	--	2	0	4	8	0	0	0	0	50
Roanoke	1	--	0	0	4	2	0	0	0	1	18
West Virginia:											
Charleston	0	2	0	0	1	1	0	0	0	0	5
Huntington	4	--	--	11	--	2	0	--	0	0	--
Wheeling	0	1	0	0	2	2	0	0	0	9	11
North Carolina:											
Gastonia	0	1	--	0	--	1	0	--	0	3	--
Raleigh	1	--	0	1	4	1	0	1	0	39	13
Wilmington	0	--	0	0	1	2	0	1	0	0	8
Winston-Salem	0	--	0	0	0	5	0	0	3	6	7
South Carolina:											
Charleston	0	10	0	0	5	3	0	0	0	0	22
Florence	1	--	0	0	1	0	0	0	0	0	15
Greenville	0	--	0	0	2	1	0	0	0	3	6
Georgia:											
Atlanta	7	30	2	8	9	9	0	6	0	7	86
Brunswick	0	--	0	0	0	0	0	0	0	0	1
Savannah	0	2	1	0	2	0	0	1	0	0	37
Florida:											
Miami	0	--	0	53	0	2	0	3	0	5	25
Tampa	2	1	1	1	3	1	0	0	0	0	19
Kentucky:											
Covington	0	1	0	1	3	1	0	3	0	4	21
Lexington	0	--	0	1	1	0	0	1	0	2	18
Louisville	4	1	0	14	7	22	0	2	0	20	71
Tennessee:											
Knoxville	4	--	1	0	1	2	0	1	0	0	17
Memphis	6	--	1	24	6	3	0	5	0	6	80
Nashville	4	--	1	1	4	3	0	0	0	0	45
Alabama:											
Birmingham	9	13	1	4	5	8	0	8	0	0	82
Mobile	0	--	0	0	0	0	0	1	0	0	22
Montgomery	2	--	--	0	--	1	0	--	0	4	--
Arkansas:											
Fort Smith	1	--	--	0	--	6	0	--	0	2	--
Little Rock	2	--	1	1	7	0	0	1	0	0	9
Louisiana:											
Lake Charles	0	--	0	0	0	0	0	0	0	0	4
New Orleans	9	2	0	0	11	8	0	11	6	2	150
Shreveport	4	--	0	0	6	2	0	2	0	0	48

City reports for week ended Nov. 20, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Oklahoma:											
Muskogee	0	------	------	0	------	2	0	------	1	0	------
Oklahoma City	1	------	0	0	7	2	0	2	0	0	49
Tulsa	0	------	------	0	------	6	0	------	0	15	------
Texas:											
Dallas	2	1	1	0	3	12	0	4	1	3	60
Fort Worth	1	------	0	0	3	3	0	2	0	6	37
Galveston	0	------	0	0	3	1	0	1	2	0	17
Houston	6	------	0	0	5	2	0	5	0	0	78
San Antonio	0	------	0	0	5	0	0	4	0	1	48
Montana:											
Billings	0	------	0	0	2	0	0	0	1	0	6
Great Falls	0	------	0	0	1	0	6	0	0	13	6
Helena	0	------	0	0	0	1	0	0	0	5	4
Missoula	0	4	1	0	2	0	0	0	0	0	9
Idaho:											
Boise	0	------	0	0	2	0	1	0	0	0	12
Colorado:											
Colorado Springs	0	------	0	0	2	4	0	3	0	0	15
Denver	6	------	3	23	7	13	0	0	0	4	71
Pueblo	0	------	0	1	2	0	0	0	0	0	15
New Mexico:											
Albuquerque	0	------	0	18	0	0	0	2	1	2	10
Utah:											
Salt Lake City	0	------	2	1	3	15	0	0	0	8	30
Washington:											
Seattle	0	------	0	2	9	2	0	4	2	10	90
Spokane	0	------	0	1	5	0	0	0	1	3	38
Tacoma	0	------	0	0	2	4	1	1	0	9	35
Oregon:											
Portland	8	3	0	4	1	6	1	1	0	0	63
Salem	0	------	------	2	------	0	0	------	0	0	------
California:											
Los Angeles	15	13	1	0	14	27	0	12	1	18	343
Sacramento	1	1	0	1	0	0	0	2	0	20	20
San Francisco	1	6	0	2	4	1	0	11	0	39	167

State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths	
Massachusetts:			
Boston	0	0	1
Worcester	0	1	1
Rhode Island:			
Providence	0	0	1
New York:			
New York	2	1	2
New Jersey:			
Camden	0	0	1
Pennsylvania:			
Philadelphia	0	0	1
Indiana:			
Indianapolis	0	0	1
Illinois:			
Chicago	3	1	0
Michigan:			
Detroit	1	1	0
Flint	0	0	1
Wisconsin:			
Milwaukee	0	0	1
Minnesota:			
Minneapolis	1	0	0
St. Paul	0	0	1
Iowa:			
Des Moines	0	0	1
Missouri:			
Kansas City	0	0	1
St. Joseph	0	0	1
St. Louis	0	0	1
Maryland:			
Baltimore	1	1	1
District of Columbia:			
Washington	3	1	0
West Virginia:			
Charleston	0	0	1
Georgia:			
Atlanta	0	0	1
Florida:			
Tampa	1	0	2
Kentucky:			
Louisville	1	0	0
Tennessee:			
Knoxville	3	0	0
Nashville	1	0	0
Alabama:			
Birmingham	2	1	0
Louisiana:			
Lake Charles	1	0	0
New Orleans	0	0	1
Shreveport	0	1	0
Texas:			
Dallas	1	1	0
Colorado:			
Denver	0	0	1
Pueblo	0	0	2
California:			
Los Angeles	0	0	1
San Francisco	0	0	3

Encephalitis, epidemic or lethargic.—Cases: Toledo, 1; Kansas City, 1; St. Louis, 1; Cumberland, 1; Washington, 1; Spokane, 1.
Pellagra.—Cases: Atlanta, 1; Memphis, 1; Birmingham, 1; San Antonio, 1; Los Angeles, 1.
Rabies in man.—Deaths: Nashville, 1.
Typhus fever.—Cases: Charleston, S. C., 2; Savannah, 2; Houston, 1; Los Angeles, 2.

FOREIGN AND INSULAR

BELGIUM

Vital statistics—1936.—The following table shows the vital statistics for Belgium for the year 1936:

Number of marriages	64, 749
Marriages per 1,000 inhabitants	7. 77
Number of live births	126, 710
Number of live births per 1,000 inhabitants	15. 21
Number of deaths	106, 190
Number of deaths per 1,000 inhabitants	12. 75

CANADA

Provinces—Communicable diseases—2 weeks ended November 6, 1937.—During the 2 weeks ended November 6, 1937, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada, as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis			1		1			1		3
Chicken pox		20		145	266	138	76	81	154	830
Diphtheria		1	5	175	9	9	4	1		204
Dysentery			1	6	3					10
Erysipelas				12	4	3	2	1	5	27
Influenza		2			6				8	16
Measles		26	3	108	52	3	64	24	124	404
Mumps		15			160	7	3	8	14	207
Paratyphoid fever					2					2
Pneumonia		2			19		7		15	43
Poliomyelitis		1	7	2	47	14	51	13	2	137
Scarlet fever		18	7	316	164	50	66	65	51	737
Smallpox				1						1
Tuberculosis	3	10	6	84	75	49	21	3	18	269
Typhoid fever		15	17	67	14	3	27	1	1	145
Undulant fever					3	1				4
Whooping cough		6	1	336	159	63	31	54	50	700

FINLAND

Communicable diseases—October 1937.—During the month of October 1937, cases of certain communicable diseases were reported in Finland as follows

Disease	Cases	Disease	Cases
Diphtheria	501	Poliomyelitis	53
Dysentery	10	Scarlet fever	846
Influenza	1, 575	Typhoid fever	29
Lethargic encephalitis	1	Undulant fever	3
Paratyphoid fever	123		

ITALY

Communicable diseases—4 weeks ended September 12, 1937.—During the 4 weeks ended September 12, 1937, cases of certain communicable diseases were reported in Italy as follows:

Disease	Aug. 16-22		Aug. 23-29		Aug. 30-Sept. 5		Sept. 6-12	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	65	34	43	36	70	43	45	38
Cerebrospinal meningitis	15	15	11	10	10	10	7	7
Chicken pox	72	57	60	53	59	43	58	42
Diphtheria	455	264	473	266	501	263	577	302
Dysentery	122	57	124	65	104	57	80	47
Hookworm disease	13	8	18	11	8	5	17	7
Lethargic encephalitis			2	2			1	1
Measles	427	191	480	171	330	161	314	152
Mumps	120	54	105	59	92	50	97	49
Paratyphoid fever	258	152	230	143	275	150	282	159
Poliomyelitis	76	60	67	51	67	50	60	47
Puerperal fever	41	39	30	28	43	39	23	21
Scarlet fever	207	111	200	97	259	126	244	109
Typhoid fever	1,282	653	1,405	678	1,462	709	1,402	650
Undulant fever	62	53	60	50	60	46	54	46
Whooping cough	370	152	386	138	343	146	298	119

PANAMA CANAL ZONE

Notifiable diseases—July-September 1937.—During the months of July, August, and September 1937, certain notifiable diseases, including imported cases, were reported in the Panama Canal Zone and terminal cities as follows:

Disease	July		August		September	
	Cases	Deaths	Cases	Deaths	Cases	Deaths
Chicken pox	6		6		11	
Diphtheria	29		25		15	
Dysentery (amoebic)	6	1	13		7	
Dysentery (bacillary)	1	1	6	1	1	1
Leprosy	3				1	
Lethargic encephalitis					1	
Malaria	165	3	106		94	3
Measles	25		16			
Meningococcus meningitis	1		1			
Mumps	48		41		44	
Pneumonia		29		20		28
Poliomyelitis			1			
Scarlet fever			1	1		
Tuberculosis		29		27		26
Typhoid fever	3	2	1		3	
Typhus fever			1		1	
Whooping cough	8			5		13

YUGOSLAVIA

Communicable diseases—4 weeks ended November 7, 1937.—During the 4 weeks ended November 7, 1937, certain communicable diseases were reported in Yugoslavia as follows:

Disease	Cases	Deaths	Disease	Cases	Deaths
Anthrax	42	4	Poliomyelitis	4	1
Cerebrospinal meningitis	17	6	Scarlet fever	474	3
Diphtheria and croup	1,435	79	Sepsis	13	2
Dysentery	199	18	Tetanus	34	13
Erysipelas	226	2	Typhoid fever	882	70
Measles	66		Typhus fever	5	
Paratyphoid fever	16		Weil's disease	1	

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for November 26, 1937, pages 1738-1752. A similar cumulative table will appear in the PUBLIC HEALTH REPORTS to be issued December 31, 1937, and thereafter, at least for the time being, in the issue published on the last Friday of each month.

Cholera

China.—Cholera has been reported in China as follows: Week ended October 9, 1937, 2 cases in Mukden, Manchuria; week ended November 13, 19 cases in Swatow; week ended November 20, 1 case in Hong Kong, 1 case in Macao, and 49 cases in Shanghai.

Plague

Hawaii Territory—Island of Hawaii—Hamakua District—Hamakua Mill Sector.—A rat found on November 20, 1937, in Hamakua Mill Sector, Hamakua District, Island of Hawaii, Hawaii Territory, has been proved plague infected.

United States—California.—A report of plague infection in California appears on page 1843 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

French Indochina—Haiphong.—During the week ended November 13, 1937, 2 cases of smallpox with 1 death were reported in Haiphong, French Indochina.

Yellow Fever

Colombia—Santander Department—Velez.—On October 26, 1937, 2 deaths from yellow fever were reported in Velez, Santander Department, Colombia.

Senegal.—Yellow fever has been reported in Senegal as follows: November 22, 1 suspected case in Ker Moussa; November 5-7, 2 cases with 2 deaths in Rufisque; November 23, 1 case on the aviation field at Thies.

x

UNITED STATES TREASURY DEPARTMENT

PUBLIC HEALTH REPORTS

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VOLUME 52 :: :: NUMBER 51

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

The PUBLIC HEALTH REPORTS is published primarily for distribution, in accordance with the law, to health officers, members of boards or departments of health, and other persons directly or indirectly engaged in public health work. Articles of special interest are issued as reprints or as supplements, in which forms they are made available for more economical and general distribution.

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Librarians and others should preserve their copies for binding, as the Public Health Service is unable to supply the general demand for bound copies. Indexes will be supplied upon request.

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PUBLIC HEALTH REPORTS

VOL. 52 DECEMBER 17, 1937 NO. 51

AN UNUSUAL OUTBREAK OF MEASLES IN HAWAII, 1936–37[1]

The Territory of Hawaii has recently experienced the severest and most virulent epidemic of measles in its recorded history, according to reports received from Dr. F. E. Trotter, Territorial commissioner of public health. The last previous outbreak of measles in Hawaii occurred in the spring of 1932 and was followed by a period of 4 years of unusually low prevalence, during which the number of reported cases averaged less than 10 per month (fig. 1).

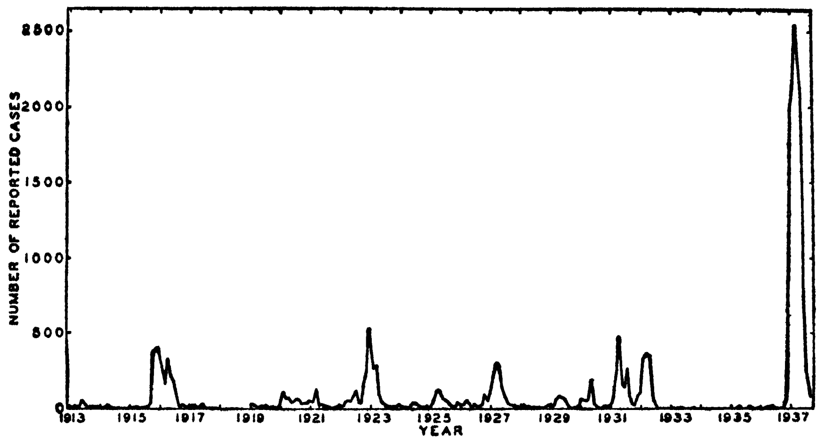

FIGURE 1.—Number of reported cases of measles, by months, Hawaii, 1913–37. (Data for 1918 not available.)

In October 1936, 67 cases were reported; in November, 384 cases; and in December, 1,289 cases. The epidemic spread rapidly, reaching its peak in March 1937, when 2,558 cases were reported. The number of reported cases from November 1936, when the epidemic first started, until September 1937, when it was practically over, equaled the number reported during the preceding 20 years.

The outbreak was accompanied by a high mortality. The number of deaths from measles during the first 3 months of 1937 exceeded that from any cause except heart disease and pneumonia. The rate per 100,000 estimated population (annual basis) was 102 for measles, 110 for pneumonia, and 125 for heart disease. For the first 6 months of 1937 the rates were 81 for measles, 101 for pneumonia, and 118 for heart disease. The epidemic has decreased, however, so that the

[1] From the Division of Public Health Methods, National Institute of Health.

death rate for the first 9 months has dropped to 55 per 100,000 population, and the rate for the entire year probably will not exceed 50 per 100,000 population.

The nearest approach to an epidemic of this severity in the United States is that which occurred in Rhode Island in 1900, when the death rate was 43 per 100,000 population and that in North Carolina in 1917, with a death rate of 42 per 100,000 population.

When a community has long been free from outbreaks of measles, the introduction of the infection is often followed by a severe epidemic, but epidemics of the degree of severity recently experienced in Hawaii

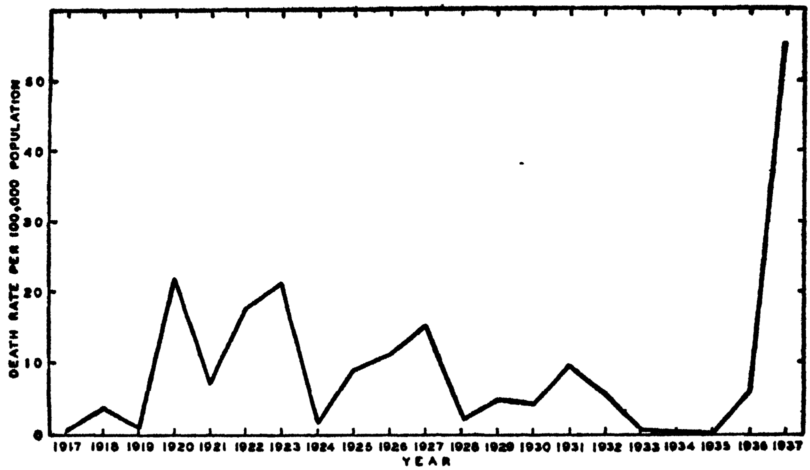

FIGURE 2.—Number of deaths from measles per 100,000 population, Hawaii, 1917–37. (The rate for 1937 is based on data for the first 9 months only.)

are rare. The case rate of illness from measles reaches its peak among children less than 5 years of age (*1*). Figure 1 shows that very few cases of measles had been reported in Hawaii since the middle of 1932, so that very few of the children under 5 years of age at the end of 1936 had ever had the disease. Thus conditions were favorable for a severe epidemic. Perhaps the most celebrated outbreaks of measles in modern times are those in the Faroe Islands in 1846, when over 6,000 persons out of a total population of 7,782 were attacked (*2*), and in the Fiji Islands in 1875, when it is estimated that about one-quarter of the population died within 3 months (*3*, *4*).

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NOTE ON THE PREPONDERANCE OF CASES WITH BULBOPONTINE INVOLVEMENT IN A SMALL OUTBREAK OF POLIOMYELITIS IN AUSTIN, TEX.

By ALEXANDER G. GILLIAM, *Passed Assistant Surgeon, United States Public Health Service*, and GEORGE M. DECHERD, *City Health Officer, Austin, Tex.*

During the last week of June and in the first week of July 1937, 13 cases of poliomyelitis, 3 of which terminated fatally, were reported to the city health department of Austin, Tex. Three additional cases were diagnosed in retrospect and later reported. Because of this rather alarming increase in incidence, the patients in all nonfatal cases were interviewed and examined by the authors. Counting all cases, 4 of which, however, were brought into Austin from the surrounding county for treatment, they represent an attack rate of approximately 24 per 100,000 population.

Investigation further revealed that (1) the dates of onset of illness ranged from May 27 to July 6, (2) the cases had been well-scattered geographically, (3) there was no detected evidence of any common source of infection, either through contact with prior cases or through the ingestion of infected milk or ice cream, (4) 62 percent of the patients were 10 years of age or over, and (5) clinical evidence indicated that bulbopontine involvement was more common in these cases than affection of the spinal cord.

It is the purpose of this note to direct attention, briefly, to the tendency in this small outbreak toward this involvement of the cranial nerves, such affection being noted in 14 of the 16 instances of infection which reached the level of clinical recognition. To this end, the following brief résumés of the cases are presented:

1. White male, aged 18 months, onset May 27. Involvement of both legs, with residual[1] weakness in both quadriceps femori. No known cranial nerve involvement.

2. White female, aged 9 years, onset June 8. Involvement of both legs, with recovery; transient diplopia and temporary inability to talk. Residual dysphonia and "toxic psychosis"(?).

3. White male, aged 10 years, onset June 11. Temporary weakness in the right arm, with dysphagia, dysphonia, and difficulty in "blowing". Residual difficulty in swallowing solids.

4. White male, aged 7 years, onset June 17. Transient inability to swallow, and voice change to a thick, nasal quality. Residual dysphonia and weakness in the right deltoid and in the supinators and pronators of the right forearm; questionable left palatal weakness.

[1] By "residual" is meant the disability noted on examinations made in the middle of July.

5. White female, aged 13 years, onset June 21. Transient diplopia and dysphonia. Residual weakness in the entire left arm and in the right triceps and deltoid, and slight atrophy in both deltoids.

6. White male, aged 18 years, onset June 22. Transient dysphonia and difficulty in breathing. Residual paralysis in all four extremities. Patient was not completely examined because of the persistence of pain and tenderness.

7. White male, aged 25 years, onset June 22. No cranial nerve involvement. Residual weakness in the entire left arm, but worse in the triceps, deltoid, and in the left hand grip.

8. White male, aged 22 years, onset June 26. Transient diplopia and dysphonia. Weakness in the left arm, but severe weakness in the deltoid.

9. White male, aged 4 years, onset June 30. Transient inability to swallow. Residual left facial paralysis, left lid lag, tongue deviation to the left, and slight weakness in the left quadriceps femoris.

10. White female, aged 23 years, onset July 1. Transient inability to swallow. Residual thick, nasal speech and inability to cough. No extremity paralysis detected.

11. White male, aged 12 years, onset July 2. Diplopia, dysphagia, and respiratory difficulty. Respiratory failure and death on July 5.

12. White male, aged 8 years, onset July 3. Transient slight dysphonia. Residual left facial paralysis and tongue deviation, and a slight left internal strabismus. No extremity weakness detected.

13. White male, aged 10 years, onset July 3. Respiratory death on July 13.

14. White male, aged 6 years, onset July 3. Transient dysphagia. Residual dysphonia, with slight involvement of the left side of the palate. Extremities not examined because of the persistence of stiff neck and the general condition of the patient.

15. White female, aged 13 years, onset July 4. Paralysis both legs. Respiratory failure and death on July 6.

16. White female, aged 12 years, onset July 6. Transient dysphagia and residual dysphonia. Extremities not examined because of persistence of stiff neck and the general condition of the patient.

MEDICAL ACTIVITIES AT THE BOY SCOUT JAMBOREE HELD IN WASHINGTON, D. C., JUNE 30–JULY 9, 1937

By W. L. Smith, *Surgeon*,[1] *United States Public Health Service*

The year 1935 was the twenty-fifth anniversary of the founding of the Boy Scouts of America, and in commemoration of this event it was proposed to hold a Jamboree in Washington, D. C., in August of that

[1] Chief medical officer of the Jamboree

year. Camp sites were selected and the camps were pretty well completed when, on account of the prevalence of poliomyelitis in nearby States, it was thought best to abandon the idea of a Jamboree at that time. Early in 1937 it was decided to hold the postponed celebration in Washington for a period of 10 days from June 30 to July 9.

The camp site chosen was probably the best that could be obtained, but it was unfortunate that it necessitated scattering the camps in groups over a considerable area. There were 2 sections near Arlington, 6 sections on Columbia Island, in the Potomac River, 4 sections in West Potomac Park, 6 sections in East Potomac Park near Hains Point, 1 section in the Cricket Grounds, and 1 section with general headquarters and the arena in the Washington Monument Grounds. It is not intended to discuss the camp from any but a health standpoint, but it is felt that from the health and safety angle the multiplicity of camp sites undoubtedly added greatly to the difficulties and somewhat to the expense of administration.

Construction was begun on the camp several months before the opening date. The latrines and shower baths, built of wood, were constructed first. Some of the camp sites were very low; and at the beginning of the Jamboree, heavy rains raised the level of the ground water in some sections so as to interfere with the functioning of the pit-type latrines and for a time caused some apprehension from a sanitary standpoint.

For administrative purposes the Boy Scouts of America are divided into 12 regions, each administered by a regional executive. The Jamboree camp was divided into 20 sections of approximately 1,250 boys each. The camp was administered through both the regional executives and the section directors, although the section lines did not coincide with the regional limits. Each section had an administrative unit and a quartermaster unit which was in direct touch with headquarters by telephone.

The headquarters of the Jamboree was situated between 17th Street and the Washington Monument. The Health and Safety Headquarters occupied one-half of a large tent. This department was under the direct control of Mr. Fred C. Mills, Director of Health and Safety of the Boy Scouts of America, and it was due mainly to his careful planning, his genius for organization, and his laborious attention to details that it functioned in such a satisfactory manner.

The Health and Safety Department had three divisions: sanitation, safety, and medical. The sanitation division consisted of sanitary engineers, sanitary inspectors, food inspectors, and others. The safety division was in charge of all fire prevention and protection, promulgated all accident and safety measures, and investigated each accident. The medical division consisted of the chief medical officer, assistant chief medical officer, a part-time medical officer for emer-

gencies, a chief medical inspector, a controller of medical supplies, 2 ambulance drivers, 1 secretary, 1 chauffeur, 1 dispatch rider, and 2 orderlies.

The Health and Safety Headquarters personnel as an assembled machine adjusted itself quickly, did not require a long period of "breaking in", and was early functioning at its highest efficiency.

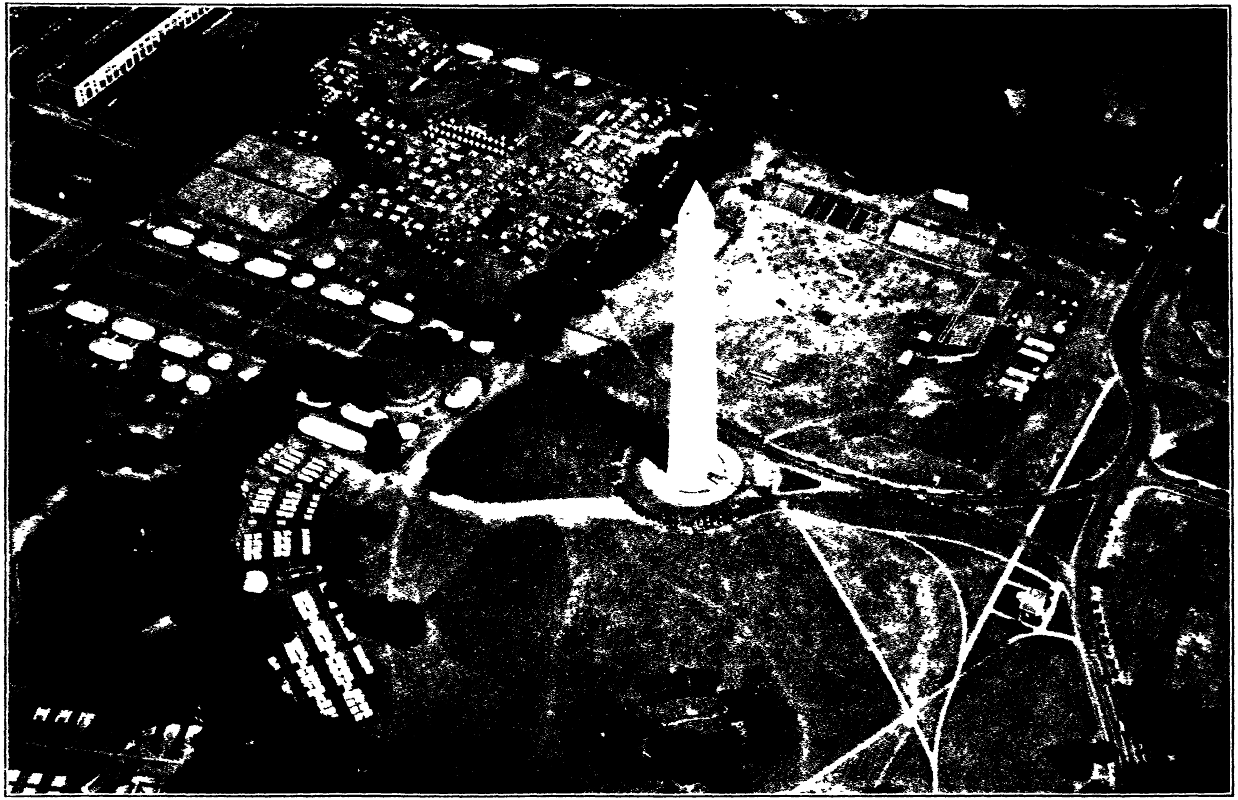
In each unit was a first-aid station. These stations were in tents, and were protected by mosquito bars. Each tent was divided by cotton cloth partitions into three compartments—a reception room, a treatment room, and a room fitted with cots for the temporary detention of patients. These first-aid stations were supplied from headquarters with a complete set-up as soon as the section began to fill up and the doctors arrived. The matter of supplies presented difficulties, inasmuch as no similar mobilization had ever been held in this country and there were no previous records to guide us. A supply table had to be devised, and of course mistakes were made. For instance, a quart of castor oil was supplied each station. It may occasion no surprise to learn that, after the Jamboree, these 20 quarts of castor oil were returned intact! Epsom salts were not popular either. Milk of magnesia tablets proved more acceptable.

The first-aid tents were very completely equipped with sheets, mattresses, pillows, electric fans, water coolers, oil stoves, waste cans, basins, pitchers, pails, urinals, bed pans, wash basins, pus basins, food trays, ice bags, hot water bottles, syringes, stomach tubes, hypodermics, instruments sufficient for minor surgery, antiseptics, antitetanus serum, and a wide selection of drugs. Undoubtedly, they were somewhat over-equipped. Narcotics and alcohol, furnished by the United States Public Health Service on prescription, were used sparingly.

The first-aid stations were each manned by three physicians and four orderlies. This personnel was all volunteer and was brought to the Jamboree from all sections of the United States. Each region was responsible for recruiting a sufficient number of doctors and orderlies to take care of the Scouts from its section. This plan resulted in the acquisition of a very fine staff. The medical officers were of an unusually high type and were found to be capable and dependable. They were very cooperative, and even at times when conditions were somewhat trying there was no friction or unpleasantness. It would require too much space in this report to commend each one separately, but, individually and collectively, their cooperative attitude and intelligent administration of their jobs are deserving of the highest commendation.

Three doctors were allotted to each first-aid station. The doctor in charge signed the requisitions for supplies, made reports, and attended to similar administrative duties. These doctors arranged their

COLUMBIA ISLAND CAMP.



HEADQUARTERS ARENA AND SECTION "Q."

PLATE III

CAMP AT HAINS POINT, EAST POTOMAC PARK.

time so that there was one on duty at the first-aid station at all times. In addition to that duty, they also assisted in physical examinations and in the first aid at the various Jamboree activities outside their camp.

The first-aid stations were connected with the Headquarters indirectly by telephone; that is, communication regarding medical service was secured through connection with the administrative head or quartermaster of each section, and thence by messenger to each first-aid station. This arrangement was very unsatisfactory, as it was too time-consuming and tied up the telephone lines too much of the time. It is felt that it would not be advisable to attempt a service of this magnitude a second time without direct telephone connection.

An important asset to the medical service was the inspector of first-aid stations, Commodore W. E. Longfellow, Assistant National Director of First Aid and Life Saving of the Red Cross of America, who visited each first-aid station daily and acted as a liaison between the stations and Headquarters. He listened to complaints and was very resourceful in removing the causes. He saw that the stations got needed supplies and services. His work was arduous and entailed considerable exposure to rain and heat. His knowledge of conditions in all the camps was probably as extensive as that of anyone in the camp; his visits to the first-aid stations soon became an event to the station personnel.

In addition to the above-mentioned facilities in the camp for the care of the Scouts, it was necessary to set up first-aid stations for the different activities in which the Scouts engaged and wherever any considerable number of Scouts congregated. These stations were provided by the District of Columbia Chapter of the American Red Cross under the direct supervision of Mr. Gordon Stone, director of first aid and life saving. For this purpose the Red Cross furnished ambulances and trained first-aid workers. At times they were assisted by doctors from the Jamboree personnel. It was necessary to set up such service at the arena for the campfire on the opening night, for circuses on each of 6 nights, for convocation on Sunday, for the gathering at Arlington on July 5, for the Sea Scouts regatta at Hains Point, and for the line of march for the President's review. This work was ably planned and efficiently executed.

A very useful dental unit was installed at Headquarters, to which all dental cases were referred. It was equipped with an Army dental outfit and was conducted by Dr. R. R. Davenport, of Boston, Mass., Dr. R. S. Cranmer, of Camden, N. J., and Dr. Irving Clark, of Janesville, Wis. This unit functioned day and night throughout the Jamboree and rendered efficient and valuable service.

The medical supplies were received, checked, and issued by Staff Sgt. S. Hamilton and Pvt. Tom Hoover, of the United States

Army. As soon as a section began to fill up and the doctors arrived, the complete set-up for the aid post was forwarded at once by truck, and the supplies were issued to the doctor in charge. These men attended to requisitions during the progress of the camp, and at the end of the Jamboree they collected the supplies remaining in the sections and returned them to Headquarters.

In addition to the above facilities, Headquarters had detailed to it a United States Public Health Service ambulance, with two drivers, sent down from New York. This ambulance was used for transporting contagious cases and for emergency calls, as well as for many calls of a more ordinary nature. One driver was constantly at Headquarters.

Thus far the facilities for the care of the Scouts inside the camp have been discussed. As it was necessary to provide hospital facilities for the sick Scouts, and as it was not considered feasible to establish such facilities within the camp, arrangements were made for them at hospitals in Washington. Through the courteous cooperation of Rear Admiral P. C. Rossiter, Surgeon General of the Navy, and Captain G. C. Thomas, Commanding Officer of the United States Naval Hospital in Washington, arrangements were made for the care of all noncontagious diseases at the Naval Hospital. At the opening of the Jamboree, Admiral Rossiter came to Headquarters and offered the facilities under his command without limit. Originally a maximum of 100 beds had been suggested, but he raised that to as many beds as might be needed. He also stated that additional nurses had been brought to Washington to help care for the Scouts. He offered ambulance service freely and it was freely used. No instance came to notice of a Scout having to wait longer than 30 minutes for an ambulance after one had been called. The Admiral also offered the use of the Naval Dispensary for the care of eye, ear, nose, and throat cases requiring special attention. This was a service that was urgently needed and greatly appreciated. There can be no exaggeration regarding the excellence of the service rendered by the Naval Hospital; the kindness shown the Scouts, the courtesy and consideration shown their friends and relatives, and the provision of the highest quality of medical and surgical care for these lads could not fail to stimulate a profound sense of gratitude in the layman and excite the highest admiration in the profession.

In the care of cases of contagious diseases, the District of Columbia health authorities, under the direction of Dr. James G. Cumming, chief of the bureau of preventable diseases, were equally cooperative. All contagious cases were well taken care of at Gallinger Hospital, and the authorities were very cooperative at all times. In addition to these services, Dr. Stewart M. Grayson, medical inspector of the District Health Department, was detailed to visit the camp daily,

to pass on all contagious cases and to investigate all threats of epidemics. The work was efficiently done.

When a Scout applied for admission to the camp he was required to give a medical history and undergo a physical examination given by a legally qualified physician selected at home. This history and report of examination were forwarded to National Scout Headquarters for approval before the Scout was accepted for camp. Any cases that showed physical defects that might be expected to interfere with the boy's welfare in camp were rejected. Diabetes, heart trouble, asthma, and convulsions were some of the causes for rejections. In spite of this precaution, boys arrived in camp with diabetes, asthma, tuberculosis, mental conditions, and also with a history of recent exposure to mumps. These conditions were not noted on the physical examination blanks, or they would have been cause for rejection, as the camp activities were considered too strenuous for boys so handicapped, and as no special unit had been provided for their care. The fact that these boys were passed for camp in spite of their handicaps suggests that, in some instances, the examining physician was too sympathetic with the boy's desire to attend, and minimized his disability. This condition suggests the advisability of having future preliminary examinations made by a physician thoroughly familiar with camp activities.

All Scouts were required to have a recent vaccination against smallpox. In no case was there any deviation from this rule. In addition to the preliminary physical examination, the boys were checked up by accompanying physicians either en route or immediately after their arrival in camp. This check-up in camp was merely a scanning examination for the purpose of discovering any evidence of any acute condition. The boys, stripped to the waist, presented themselves to the examining physician and were looked over. If any boy showed anything suspicious he was referred to the camp physician for a more thorough and complete examination. Even as simple an examination as this is a considerable task when applied to 27,000 individuals arriving in camp at various intervals over 4 days. It was considered too big an undertaking for the Jamboree medical personnel, and so assistance was requested. Dr. Cumming, of the District Health Department, recruited approximately 60 physicians from the District and directed their activities in this work. The Army and Navy each detailed 10 medical officers to assist in this task for 3 days. The assistance thus given made a physical check up of all Scouts a thorough and useful procedure, and practically all the Scouts were thus examined shortly after arrival at camp.

As stated before, each first-aid station functioned for a full section of 1,250 Scouts. However, the Scouts were divided into troops of 32 members. Each troop was under the supervision of a scoutmaster.

The scoutmaster was furnished with sick-call blanks, and was instructed to canvass his troop each morning for any Scouts complaining of illness or injury. He prepared a list, in duplicate, on a form provided for sick-call, and at 9 a. m. he sent such boys as needed examination or treatment to the first-aid station. Here the boy was treated and returned to his unit, put to bed in the first-aid tent, or sent to the hospital as the condition indicated. In any event the diagnosis and disposition were entered on the sick-call blanks and one copy was returned to the scoutmaster for his information. The retained copy of the sick-call record, together with a section medical officer's tabulated report of all transactions, was forwarded to health and safety headquarters each day. Very minor conditions were treated and the boy was returned to his unit. If he appeared moderately ill but unable to carry on his camp activities, he was retained in the first-aid station for temporary observation and treatment. However, the doctors were instructed, and it was their universal practice, not to retain in the camp any Scout who appeared really ill or who would require observation or treatment for more than 24 hours. It was the practice, heartily concurred in by all the medical personnel, to take no chances whatever, but in any case at all doubtful, to send the boy at once to the hospital. This practice resulted in a number of boys being sent to the hospital with minor conditions, such conditions that certainly would not have entailed hospital admission had the boys been at home. A number of boys stayed in the hospital only overnight. While some cases would undoubtedly have been all right without admission to the hospital, the policy of taking no risks whatever was felt to be justified.

Minor cases were treated in the first-aid stations. Antitetanus serum and simple medicines were given, surgical dressings done, and some minor surgical operations performed there. Except in emergency, nothing else was attempted. In emergencies, only such things were done as were necessary until the patient could be sent to the hospital. While an attempt was made to have all those complaining report at morning sick-calls, cases were treated at all times whenever the occasion arose. Dental cases were referred to the dental unit at Headquarters, and eye, ear, nose, and throat cases were sent to the Naval Dispensary. All suspicious contagious cases were isolated until diagnosed or until seen by the District quarantine officer, and if found to be contagious, the patients were sent at once to Gallinger Hospital. All cases detained in the first-aid station were recorded on a hospital record card, and at the termination of the case this card was forwarded to Headquarters as a permanent record.

When it was deemed advisable to transfer a patient to the hospital, the section medical officer informed the chief medical officer, who immediately arranged for transfer to the hospital. In no instance did the chief medical officer attempt to consult concerning such cases.

The section medical officer's opinion was final and the chief medical officer saw to it that he got the service requested at the earliest possible moment. In the event of admission to the hospital, the hospital record cards were made in duplicate and gave such details of the case as the section medical officer possessed. One card was sent to the hospital with the ailing Scout as authority for his admission to the hospital, the other card was sent immediately to the chief medical officer for his record. When boys were discharged from the hospital they reported back to their units via the chief medical officer.

The medical record forms, made out in duplicate or triplicate as needed, including the following: "Daily Sick Call", filled out by the scoutmaster for the patrol leader and medical officer in charge of the hospital unit; the "Section Medical Officer's Daily Report", the original of which went to the chief medical officer and copies to the sectional director and regional scout executive; the "Daily Report of the Inspector, First-Aid Station (Section)", to the chief medical officer and the director of health and safety; the "Daily Consolidated Medical Report", made by the chief medical officer to the camp chief (through the executive director) and the director of health and safety; and the "Hospital Case Record", a case history and clinical record of patients admitted to hospital—field unit, Naval Hospital, or other city hospital.

The parents of the Scouts admitted to the hospital were not notified in every case; in many cases the condition was such a minor one that notifying the parents would only have caused needless apprehension. In all cases admitted to the isolation hospital the parents were notified at once. In cases at the Naval Hospital, of any gravity whatever, the parents were promptly notified. In cases considered seriously ill, if the parents were not present, they were kept fully informed by telegram, telephone, and air mail until the danger was over. When the medical form was being prepared, it was proposed to have printed on it permission for any necessary operation for signature by the parents. The legality of such procedure was questioned and the idea was abandoned. Therefore, when operations were indicated, it was necessary to get in contact with the parents promptly to obtain consent. In one case a father was followed by phone from Texas to Colorado before consent was obtained. In another case, acute appendicitis occurring in the middle of the night, the father of the patient could not be located, and so his friends in his home town were asked to locate him, the police were brought into the hunt, his clergyman was asked to help, the radio broadcasting stations gave assistance, the aid of the Associated Press and the radio was enlisted, and every hotel in the town was paged for him. After every possible means of finding the father had apparently been exhausted, and as the operation was considered to be urgently indicated, the surgeons at the Naval Hospital were told to proceed. Five minutes later the father, returning to his home from

a high school play, authorized the operation by telephone. This case is cited merely as an example of the care and attention to detail that the Scout authorities insisted upon in the management of these cases.

Some interesting observations were made as to the type of illnesses predominating throughout the camp. The average daily attendance at all the first-aid stations was approximately 970, of which 78 percent were surgical cases and 22 percent medical. This predominance of surgical cases was due to the number of minor injuries treated. All such cases were sent to the first-aid stations, and most of them required only the simplest of dressings. They were, however, dressed repeatedly until well. A considerable number of these minor injuries were due to cuts with the Scout axe. When many of the units arrived, it was raining heavily. The Scouts pitched their own tents, using their axes in the rain to drive tent stakes. None of these injuries was severe, and only a very few required any hospital care. No record of the number of doses of antitetanus serum given is available, but it was given freely in all cases where indicated. All cases were tested for sensitivity before the serum was given. Two mild cases of serum sickness resulted. As a result of this experience with minor accidents it is felt that the Scouts need a bit more intensive training in the use of the knife and axe.

Early in the encampment period it was noticed that colds were the most common complaint. They seemed to disappear promptly, however, on the advent of sunny weather. During the latter period of the encampment it was very hot, but no case of heat prostration or sunstroke was reported, although the heat probably aggravated some of the gastrointestinal complaints.

During this hot period, doctors in several sections simultaneously reported that boys would come to them with a little elevation of temperature and severe vomiting. They would be put to bed in the first-aid station and after sleeping 3 or 4 hours would feel all right. Examination of the food and water situation gave no solution to the difficulty. The complaint was not believed to have any background in bad sanitation, because in each camp there were enough adults to act as controls and no adults were ill. As a matter of fact, no disease appeared during the period of the encampment that could be ascribed to faulty sanitation. It was also noted that the one section of the camp that caused the most apprehension from a sanitation standpoint was the only section that did not send a single Scout to the hospital.

As there was no insanitary cause found for the vomiting and slight temperature elevation, the cases were studied further. It was found that the food was wholesome and very abundant, that the boys ate heavily, and that they were undergoing a rather strenuous routine of physical exertion; also, the weather was hot. Some of these Scouts would walk as much as 10 or 12 miles in a day and then, in the evening,

climb to the top of the Washington Monument by way of relaxation. One lad made three trips up and down the monument in one evening. The Scouts would come to their meals hot and tired, eat hurriedly, and immediately sally forth without pause and resume their exertions. Then, too, there were trading posts in all sections where sandwiches, candy, ice cream, and soft drinks were sold; and the Scouts were good customers. One lad ate 80 cents worth of ice cream as a nightcap one night. And so it was decided that the vomiting was due to fatigue plus too rapid eating of too much food. At any rate, the matter was taken up in a staff meeting before the regional executives and section directors and a plea was made to ease up on the program of activities a bit; and it was further requested that the boys be given a period of relaxation after meals. This suggestion was well received; it was put into force, and no further trouble of this nature was experienced.

Of the unusual cases it was noted that one snake bite was treated. This occurred in a Scout who handled snakes which he had as an exhibit. The bite was treated promptly and no discomfort followed. One boy was given antirabic treatment. This was done in response to a telegraphic request of his father, who reported that the Scout's dog had just died of rabies. Only one fireworks injury was recorded—a firecracker burn of the thumb. Many sore and blistered feet were taken care of, and measures were taken in the baths to prevent epidermophytosis.

During the 2 weeks, including 3 days before camp formally opened and 1 day after it closed, there were 143 admissions to the hospital. During the actual 10-day period of the Jamboree there were 113 admissions, an average of 11.3 admissions daily. The 143 admissions represented only 140 patients, as two cases were transfers from one hospital to another and the third case was admitted twice for serum sickness. Fifteen cases were admitted to Gallinger Hospital. One case was admitted for observation for meningitis, but proved to be only gastrointestinal upset aggravated by exposure to heat. One case of measles was admitted. Three mild cases of scarlet fever were admitted, one at the beginning and two near the end of the encampment, with a 10-day interval between the first and second case. Ten cases of mumps occurred; the first seven were sporadic and scattering, no two being in the same section, and not in contact. However, late in the encampment period, three cases occurred in the same group in the same section. This looked like something was starting, so the camp was visited and the cases were carefully investigated. It was found that these three Scouts had been in the same camp at home before coming to Washington and that while there they were all exposed to the same case of mumps. When it was further learned that these three boys were the only ones in camp who had been thus exposed, the apprehension of an epidemic of mumps in the Jamboree was considerably allayed.

Among the cases sent to the Naval Hospital there were only two due to traffic accidents. One boy while riding a bicycle collided with a truck and sustained severe lacerations of the scalp, and one scoutmaster, aged 50, was run down by a car, severely lacerated about the scalp, and suffered severe concussion. Another severe accident was caused by a fall in a swimming pool. The spleen was ruptured. A splenectomy was necessary, and the boy recovered. Among the injuries were noted 4 fractured clavicles, 2 fractures about the ankle, 3 fractures of the arm, and 1 fracture of the wrist. All of these were simple fractures, without much displacement, and practically all of these boys returned to the camp in splints. There were sprains as follows: Back 1, ankle 4, knee 2, and shoulders 2. Four lacerated wounds and 12 cases of infection and cellulitis were treated. One case of musculospiral palsy was caused by a tight pack strap. The above injuries were caused exactly as such injuries occur to boys at home.

One lad came to the Jamboree with boils on his arm. He gave a history of susceptibility to such infections. He developed a staphylococcus infection of the blood stream, had metastatic abscesses, ran the usual course of this type of septicopyemia, and died about 2 weeks after the Jamboree was over.

Other conditions were noted as follows: Upper respiratory infections, 19; gastroenteritis, 12; pleurisy, 1; glandular fever, 1; tonsillitis, 2; otitis media, 3; infected gall bladder (adult), 1; pulmonary tuberculosis, 1; pyelitis, 2; serum sickness, 2; dermatitis, 1; fatigue, 1; asthma, 2; and malaria (imported), 2.

Twenty cases were sent to hospital diagnosed as appendicitis, but only three of the patients were operated on. It may be argued that the physicians had an appendicitis complex in thus diagnosing these cases, but some interesting observations were made on many of them at the Naval Hospital. These boys would become suddenly ill with constipation, abdominal cramps, and vomiting. Upon arrival at the hospital they would have some slight rise in temperature, and many of them had localized tenderness and a definite rise in the white count. Undoubtedly, any surgeon would have been justified in operating on many of these patients, but taking into consideration the facts that the boys were eating rather heavily and living under unusual conditions, the surgeons elected a conservative course, and it is believed that the results amply justified their stand. On admission these patients were given an enema and their diet was adjusted; within 24 hours they would be much improved, and within another 48 hours they would return and resume their activities in the camp. The three operations were done under local anesthesia and the patients made fine recoveries.

No report of the Jamboree activities would be complete without saying something of the morale of the Scouts. They were a happy,

keen, interested group. When it rained hard, and things looked "down at the mouth", they did not repine; they put on their bathing suits and played football in the slippery mud in their camps. If their tent had to be bailed out, they bailed it out, and repeated the process as often as necessary. It is true that they threw their hats out of the windows at the Washington Monument, walked the rails of the Memorial Bridge, swam in forbidden waters, and investigated the Capitol building with disconcerting minuteness; but there wasn't a thimbleful of evil in the entire outfit!

It is surely an unusual experience for a city to have 27,000 visitors for 10 days with a record that, among these visitors, there was not a single fight, a single drunk, a single case of venereal disease, and that it was not necessary to put a single one of these exemplary visitors in jail!

It appears to be the common feeling that the Boy Scout Jamboree was a great success. This success was accomplished by the organizing ability and careful planning of the leaders of the Boy Scouts of America, and by the able administration of Camp Chief Dr. James E. West and Executive Director A. A. Schuck; and it cannot fail to be considered as a strong testimonial to their energy and ability.

With particular regard to the medical service it is felt that the fact that it functioned as well as it did is due to three principal elements:

(1) The excellent type of men provided for the field work was conducive to constant watchful attention, and prompt, intelligent disposition of medical conditions.

(2) The very fine cooperation by the different United States Government and District of Columbia services insured prompt and adequate care.

(3) Last, but not least, the proper utilization of the above-mentioned facilities was made possible by the well-planned set-up furnished by Scout authorities, and particularly by the administrative ability and untiring attention to detail of the Health and Safety Service of the Boy Scouts of America.

DEATHS DURING WEEK ENDED NOVEMBER 27, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Nov. 27, 1937	Corresponding week, 1936
Data from 86 large cities in the United States:		
Total deaths	7,806	8,259
Average for 3 prior years	8,119	
Total deaths, first 47 weeks of year	402,414	403,141
Deaths under 1 year of age	455	485
Average for 3 prior years	532	
Deaths under 1 year of age, first 47 weeks of year	25,769	26,053
Data from industrial insurance companies:		
Policies in force	69,959,008	68,752,055
Number of death claims	10,433	10,421
Death claims per 1,000 policies in force, annual rate	7.8	7.9
Death claims per 1,000 policies, first 47 weeks of year, annual rate	9.7	9.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers.

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (-----) indicate that cases or deaths may have occurred, although none was reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 4, 1937, and Dec. 5, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 4, 1937	Week ended Dec. 5, 1936	Week ended Dec. 4, 1937	Week ended Dec. 5, 1936	Week ended Dec. 4, 1937	Week ended Dec. 5, 1936	Week ended Dec. 4, 1937	Week ended Dec. 5, 1936
New England States:								
Maine	-------	5	-------	-------	40	33	0	1
New Hampshire	-------	-------	-------	-------	47	2	0	0
Vermont	-------	-------	-------	-------	63	-------	0	0
Massachusetts	1	4	-------	-------	78	282	1	3
Rhode Island	-------	1	-------	-------	-------	147	0	0
Connecticut	14	4	6	4	6	75	1	1
Middle Atlantic States:								
New York	28	33	[1] 21	[1] 7	130	224	7	8
New Jersey	30	11	18	12	596	33	3	2
Pennsylvania	30	72	-------	-------	1,378	45	5	8
East North Central States:								
Ohio	41	34	2	4	269	10	3	5
Indiana	39	20	64	33	143	12	2	4
Illinois	39	25	30	22	628	19	3	8
Michigan	39	38	3	4	172	21	0	2
Wisconsin	5	6	47	27	82	44	0	0
West North Central States:								
Minnesota	9	7	1	1	5	15	4	0
Iowa	6	2	1	-------	8	6	1	2
Missouri	17	29	48	58	151	7	1	3
North Dakota	2	5	2	11	2	-------	0	0
South Dakota	-------	-------	-------	-------	-------	1	0	0
Nebraska	9	5	-------	-------	1	2	0	2
Kansas	6	16	4	1	20	14	0	1
South Atlantic States:								
Delaware	-------	3	-------	-------	-------	9	0	0
Maryland [3]	20	19	4	14	8	84	4	6
District of Columbia	6	13	1	2	5	7	3	2
Virginia	34	57	-------	-------	102	30	3	8
West Virginia	29	26	24	24	141	15	2	3
North Carolina [3,4]	70	102	3	2	321	21	3	1
South Carolina [3]	12	16	371	381	21	24	3	2
Georgia [3]	22	30	-------	-------	-------	-------	1	1
Florida [3]	16	11	12	1	40	3	1	0
East South Central States:								
Kentucky	16	35	35	15	69	3	6	7
Tennessee	27	40	72	68	127	1	3	0
Alabama [3]	31	29	151	82	18	2	1	3
Mississippi [2]	17	12	-------	-------	-------	-------	0	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 4, 1937, and Dec. 5, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 4, 1937	Week ended Dec. 5, 1936	Week ended Dec 4, 1937	Week ended Dec. 5, 1936	Week ended Dec. 4, 1937	Week ended Dec. 5, 1936	Week ended Dec. 4, 1937	Week ended Dec. 5, 1936
West South Central States:								
Arkansas	23	10	95	24	22		3	0
Louisiana	16	30	4	5		1	1	0
Oklahoma [4]	33	11	88	69	8	8	0	1
Texas [3]	57	152	354	631	80	78	2	9
Mountain States:								
Montana	1	3		4	10	4	0	1
Idaho	2	1	3	1	49	104	0	0
Wyoming					1	1	0	0
Colorado	7	7			61	2	1	4
New Mexico	3	7	1	1	43	13	0	1
Arizona	11	6	79	65		28	2	3
Utah [3]	2	1		4	48	20	0	1
Pacific States:								
Washington	5	2			34	7	2	1
Oregon	10		17	41	8	11	1	1
California	44	53	27	83	57	27	2	4
Total	829	993	1,588	1,701	5,092	1,495	75	110
First 48 weeks of year	25,336	26,041	284,737	149,753	269,401	276,276	5,073	6,967

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Dec. 4, 1937	Week ended Dec. 5, 1936	Week ended Dec. 4, 1937	Week ended Dec. 5, 1936	Week ended Dec. 4, 1937	Week ended Dec. 5, 1936	Week ended Dec. 4, 1937	Week ended Dec. 5, 1936	Week ended Dec. 4, 1937
New England States:									
Maine	0	0	79	11	0	0	1	0	33
New Hampshire	0	0	19	1	0	0	0	0	15
Vermont	0	0	8	14	0	0	0	0	47
Massachusetts	1	0	161	129	0	0	8	1	172
Rhode Island	0	0	23	28	0	0	1	2	33
Connecticut	1	0	71	44	0	0	2	1	87
Middle Atlantic States:									
New York	4	2	371	400	0	0	14	9	393
New Jersey	0	1	97	72	0	0	4	1	163
Pennsylvania	2	8	298	438	0	0	28	35	371
East North Central States:									
Ohio	1	7	317	285	1	0	7	13	638
Indiana	0	0	196	197	21	3	0	2	28
Illinois	6	6	429	343	2	1	8	13	75
Michigan	3	4	468	406	2	0	5	5	239
Wisconsin	5	0	162	197	6	7	0	1	177
West North Central States:									
Minnesota	4	0	131	140	15	4	0	2	43
Iowa	1	1	254	92	24	10	0	0	34
Missouri	5	1	162	139	7	3	12	16	95
North Dakota	0	0	45	43	12	12	2	0	24
South Dakota	0	0	25	55	10	15	0	3	34
Nebraska	0	1	33	42	4	0	1	0	26
Kansas	0	0	139	196	1	10	0	2	83
South Atlantic States:									
Delaware	0	0	7	10	0	0	0	3	7
Maryland [3]	0	1	75	87	0	0	2	3	76
District of Columbia	0	0	17	20	0	0	0	6	5
Virginia	1	2	41	61	0	0	7	7	72
West Virginia	0	0	92	52	0	0	3	6	102
North Carolina [3] [4]	1	3	62	68	0	0	3	12	215
South Carolina [3]	0	1	10	6	0	0	0	5	59
Georgia [3]	0	1	34	35	0	3	6	8	14
Florida [3]	0	0	16	13	0	0	0	0	7

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 4, 1937, and Dec. 5, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Dec. 4, 1937	Week ended Dec. 5, 1936	Week ended Dec. 4, 1937	Week ended Dec. 5, 1936	Week ended Dec. 4, 1937	Week ended Dec. 5, 1936	Week ended Dec. 4, 1937	Week ended Dec. 5, 1936	Week ended Dec. 4, 1937
East South Central States:									
Kentucky	0	1	82	54	1	0	8	9	36
Tennessee	0	4	48	37	1	0	4	11	35
Alabama [3]	4	8	27	30	0	0	2	6	44
Mississippi [2]	1	1	15	19	0	1	1	7	--------
West South Central States:									
Arkansas	0	2	40	7	2	1	6	5	24
Louisiana	1	3	3	9	0	1	4	7	26
Oklahoma [5]	2	4	64	16	2	0	16	3	18
Texas [3]	6	7	110	190	0	1	37	42	164
Mountain States:									
Montana	0	0	18	37	23	25	1	3	22
Idaho	1	0	42	36	8	1	3	2	9
Wyoming	0	0	7	17	6	0	5	1	10
Colorado	3	0	49	27	14	0	5	0	7
New Mexico	0	1	40	17	0	0	13	9	27
Arizona	1	0	6	12	0	0	5	3	--------
Utah [2]	0	0	75	19	0	0	1	0	6
Pacific States:									
Washington	4	1	46	57	16	2	1	3	106
Oregon	1	0	45	40	9	14	2	2	--------
California	9	7	176	220	13	4	11	11	279
Total	68	68	4,735	4,468	200	118	234	280	4,130
First 48 weeks of year	9,316	4,340	204,483	214,741	9,771	6,778	14,555	14,036	--------

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Dec. 4, 1937, 43 cases, as follows: North Carolina, 2; South Carolina, 4; Georgia, 19; Florida, 3; Alabama, 6; Texas, 9.
[4] Rocky Mountain spotted fever, week ended Dec. 4, 1937, North Carolina, 1 case.
[5] Figures for 1936 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
July 1937										
South Carolina	--------	110	199	1,513	69	188	4	18	0	84
August 1937										
South Carolina	1	203	226	1,567	44	112	4	23	5	50
September 1937										
South Carolina	--------	243	380	1,374	24	77	2	20	0	53
October 1937										
North Dakota	1	6	8	--------	1	--------	1	118	51	5
South Carolina	--------	343	698	1,184	44	78	2	46	0	33
November 1937										
Connecticut	2	29	14	--------	19	--------	7	210	0	3
North Carolina	11	387	12	76	819	35	6	288	0	51

Summary of monthly reports from States—Continued

July 1937

South Carolina:	Cases
Chicken pox	5
Dengue	1
Diarrhea	1,074
Hookworm disease	61
Mumps	16
Ophthalmia neonatorum	5
Paratyphoid fever	5
Rabies in animals	31
Tetanus	4
Tularaemia	2
Typhus fever	9
Undulant fever	1
Whooping cough	166

August 1937

South Carolina:	Cases
Chicken pox	12
Diarrhea	466
Hookworm disease	68
Mumps	7
Ophthalmia neonatorum	5
Paratyphoid fever	3
Rabies in animals	17
Tetanus	1
Typhus fever	8
Undulant fever	2
Whooping cough	146

September 1937

South Carolina:	Cases
Chicken pox	7
Diarrhea	303
Hookworm disease	70
Mumps	17
Ophthalmia neonatorum	9
Paratyphoid fever	4
Rabies in animals	15
Rabies in man	1
Typhus fever	11
Undulant fever	2
Whooping cough	123

October 1937

	Cases
North Dakota:	
Chicken pox	84
Mumps	1
Vincent's infection	2
Whooping cough	147
South Carolina:	
Chicken pox	18
Diarrhea	293
Hookworm disease	65
Mumps	19
Ophthalmia neonatorum	4
Paratyphoid fever	2
Rabies in animals	26
Septic sore throat	2
Typhus fever	4
Whooping cough	125

November 1937

	Cases
Connecticut:	
Chicken pox	488
Conjunctivitis, infectious	1
Dysentery (bacillary)	51
Encephalitis, epidemic or lethargic	1
German measles	23
Mumps	320
Ophthalmia neonatorum	1
Paratyphoid fever	2
Rabies in animals	2
Septic sore throat	12
Tetanus	1
Trichinosis	1
Undulant fever	4
Whooping cough	146
North Carolina	
Chicken pox	659
Dysentery (bacillary)	2
German measles	20
Ophthalmia neonatorum	1
Paratyphoid fever	4
Rocky Mountain spotted fever	1
Septic sore throat	20
Typhus fever	13
Undulant fever	3
Whooping cough	682

WEEKLY REPORTS FROM CITIES

City reports for week ended Nov. 27, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	311	499	61	602	619	1,268	8	358	37	959	--------
Current week [1]	181	170	37	1,325	490	898	11	349	29	803	--------
Maine:											
Portland	0	1	1	0	3	0	0	0	0	17	24
New Hampshire:											
Concord	------	------	------	------	------	------	------	------	------	------	------
Manchester	1	------	0	1	1	3	0	0	0	0	16
Nashua	0	------	0	0	0	0	0	0	0	1	6
Vermont:											
Barre	0	------	0	35	0	0	0	2	0	0	6
Burlington	0	------	0	0	0	0	0	0	0	1	12
Rutland	0	------	0	6	0	0	0	0	0	9	1
Massachusetts:											
Boston	3	------	0	39	12	42	0	9	0	13	195
Fall River	0	------	0	0	2	1	0	2	0	31	27
Springfield	0	------	0	1	1	10	0	3	1	15	22
Worcester	0	------	0	1	1	2	0	4	0	4	53
Rhode Island:											
Pawtucket	0	------	0	0	0	2	0	0	0	0	11
Providence	0	------	0	0	1	14	0	2	0	23	73
Connecticut:											
Bridgeport	0	1	0	0	0	6	0	2	0	0	25
Hartford	0	1	0	0	3	2	0	1	1	5	40
New Haven	0	1	0	1	2	1	0	2	0	1	42
New York:											
Buffalo	0	------	1	0	7	20	0	7	0	10	163
New York	24	14	3	24	71	64	0	65	3	113	1,279
Rochester	0	------	0	1	7	1	0	2	0	6	64
Syracuse	1	------	0	0	8	14	0	0	0	7	37

[1] Figures for Concord and Columbus estimated; reports not received.

City reports for week ended Nov. 27, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
New Jersey:											
Camden	0	1	0	0	0	8	0	1	0	1	83
Newark	1	------	0	2	5	6	0	8	0	24	104
Trenton	0	------	0	54	3	5	0	1	0	1	30
Pennsylvania:											
Philadelphia	4	------	1	15	23	52	0	25	9	82	408
Pittsburgh	7	4	3	189	15	30	0	8	1	21	156
Reading	0	------	1	2	0	8	0	0	0	2	27
Scranton	0	------	------	4	------	2	0	------	0	0	------
Ohio:											
Cincinnati	1	------	0	2	9	11	0	7	0	5	127
Cleveland	4	14	0	45	18	41	0	15	0	32	192
Columbus	------	------	------	------	------	------	------	------	------	------	------
Toledo	0	------	0	6	5	8	0	4	0	8	51
Indiana:											
Anderson	1	------	0	0	1	12	0	0	0	7	15
Fort Wayne	0	------	0	1	1	1	0	0	0	0	31
Indianapolis	5	------	0	1	13	14	0	5	0	11	106
Muncie	1	------	0	2	2	2	0	0	0	0	20
South Bend	0	------	0	0	1	3	0	1	0	5	20
Terre Haute	0	------	0	6	0	1	0	0	0	0	16
Illinois											
Alton	0	------	0	44	0	5	0	0	0	0	14
Chicago	20	10	2	132	87	122	0	32	3	25	677
Elgin	0	------	0	0	1	1	0	0	0	0	8
Moline	0	------	0	4	0	20	0	0	0	1	10
Springfield	0	------	0	1	3	5	0	0	0	0	18
Michigan:											
Detroit	11	3	1	81	22	101	0	13	1	37	241
Flint	0	------	0	1	4	19	0	1	0	10	21
Grand Rapids	1	------	0	3	0	15	0	0	0	10	29
Wisconsin.											
Kenosha	0	------	0	0	0	0	0	0	0	0	7
Madison	0	------	0	0	0	0	0	1	0	4	25
Milwaukee	0	------	0	21	6	8	0	1	0	13	95
Racine	0	------	0	0	0	1	0	0	0	2	11
Superior	0	------	0	0	0	2	0	0	0	3	8
Minnesota:											
Duluth	0	------	0	1	1	5	0	1	0	5	20
Minneapolis	0	------	0	2	3	21	0	1	0	14	82
St Paul	1	------	0	0	0	7	0	0	0	1	78
Iowa:											
Cedar Rapids	0	------	------	0	------	0	0	------	0	2	------
Davenport	0	------	------	0	------	0	0	------		0	------
Des Moines	1	------	------	0	------	44	0	------	0	1	35
Sioux City	0	------	------	0	------	1	0	------	0	2	------
Waterloo	2	------	------	0	------	7	0	------	0	0	------
Missouri:											
Kansas City	5	------	1	4	9	8	0	4	0	1	109
St Joseph	5	------	0	1	2	1	0	0	0	0	33
St. Louis	20	------	0	541	15	34	0	8	0	3	220
North Dakota:											
Fargo	0	------	0	0	0	0	0	0	0	8	7
Grand Forks	0	------	------	0	------	7	0	------	0	0	------
Minot	0	------	0	0	0	0	0	0	0	5	9
South Dakota:											
Aberdeen	1	------	------	0	------	2	0	------	0	3	------
Sioux Falls	0	------	0	0	0	4	0	0	0	0	10
Nebraska:											
Omaha	4	------	0	0	6	1	0	0	0	0	48
Kansas:											
Lawrence	0	------	0	0	1	2	0	0	0	2	8
Topeka	0	------	0	1	0	3	0	0	0	5	11
Wichita	0	------	0	0	3	3	0	0	0	7	25
Delaware:											
Wilmington	0	------	0	0	2	2	0	1	0	3	27
Maryland:											
Baltimore	18	3	1	2	17	19	0	9	1	51	186
Cumberland	0	------	0	0	0	0	0	0	0	0	12
Frederick	0	------	0	0	0	0	0	0	0	0	5
District of Columbia:											
Washington	5	1	1	1	12	11	0	13	0	5	155
Virginia:											
Lynchburg	2	------	0	0	0	1	0	0	0	0	15
Norfolk	0	------	0	13	3	5	0	1	0	1	23
Richmond	0	------	0	1	4	8	0	2	1	0	57
Roanoke	2	------	0	0	2	1	0	1	0	0	16

City reports for week ended Nov. 27, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
West Virginia:											
Charleston	0	1	0	0	2	1	0	1	0	0	17
Huntington	8	0	-	6	-	2	0	-	0	0	-
Wheeling	0	-	0	0	1	9	0	0	0	10	16
North Carolina:											
Gastonia	0	-	-	0	-	2	0	-	0	0	-
Raleigh	0	-	0	2	3	0	0	0	0	19	10
Wilmington	0	-	0	0	1	0	0	0	0	13	14
Winston-Salem	0	-	0	0	0	4	0	1	0	1	18
South Carolina:											
Charleston	1	22	0	2	5	5	0	2	0	0	32
Florence	1	0	-	0	0	0	0	0	0	0	10
Greenville	1	0	-	0	1	1	0	0	0	0	11
Georgia:											
Atlanta	8	29	2	9	14	3	0	9	0	12	103
Brunswick	0	-	0	0	2	0	0	0	0	0	11
Savannah	1	24	6	1	2	1	0	1	0	1	41
Florida:											
Miami	0	-	0	13	3	0	0	1	0	1	83
Tampa	0	1	1	0	3	1	0	1	0	0	28
Kentucky:											
Covington	0	-	0	0	5	3	0	1	0	0	21
Lexington	0	5	0	2	3	0	0	2	0	2	23
Louisville	1	1	0	20	8	24	0	2	0	7	35
Tennessee:											
Knoxville	0	-	0	0	5	5	0	0	1	0	26
Memphis	1	-	1	60	2	5	0	4	1	13	58
Nashville	1	-	2	0	2	6	0	1	0	2	45
Alabama:											
Birmingham	3	11	0	2	5	1	0	4	1	0	60
Mobile	0	-	4	-	4	2	0	1	0	0	39
Montgomery	1	1	-	1	-	1	0	-	0	0	-
Arkansas:											
Fort Smith	0	-	-	0	-	8	0	-	0	0	-
Little Rock	1	-	0	2	1	3	0	3	0	1	5
Louisiana:											
Lake Charles	0	-	0	0	2	0	0	0	0	0	12
New Orleans	2	1	1	0	13	3	0	10	0	0	172
Shreveport	0	-	0	0	7	2	0	3	1	1	50
Oklahoma:											
Oklahoma City	0	2	0	0	1	3	0	0	0	0	24
Tulsa	1	-	-	0	-	7	0	-	0	10	-
Texas:											
Dallas	8	-	0	0	4	13	0	5	0	1	78
Fort Worth	1	-	0	0	3	2	0	0	2	1	36
Galveston	0	-	0	0	3	1	0	0	0	0	14
Houston	2	-	0	0	13	3	0	9	1	0	109
San Antonio	1	-	2	1	9	1	0	8	1	0	83
Montana:											
Billings	0	-	0	1	1	0	0	0	0	0	6
Great Falls	0	-	0	1	2	0	9	0	0	4	10
Helena	0	-	0	0	0	0	0	0	0	4	1
Missoula	0	-	0	0	1	1	0	0	0	0	4
Idaho:											
Boise	0	-	0	1	2	1	0	0	0	0	7
Colorado:											
Colorado Springs	0	-	0	0	2	4	0	1	0	0	12
Denver	7	-	1	19	7	13	0	2	0	1	74
Pueblo	0	-	0	0	3	2	0	1	0	4	15
New Mexico:											
Albuquerque	0	-	0	7	3	0	0	0	0	3	13
Utah:											
Salt Lake City	0	-	0	2	1	19	0	1	0	2	27
Washington:											
Seattle	0	-	0	1	2	6	0	3	1	12	80
Spokane	0	-	0	0	1	2	0	0	1	2	23
Tacoma	0	-	0	0	0	5	2	0	0	15	28
Oregon:											
Portland	3	-	0	1	1	16	0	2	0	1	77
Salem	0	-	-	2	-	1	0	-	0	0	-
California:											
Los Angeles	8	15	0	4	11	23	0	11	0	20	293
Sacramento	0	10	0	0	0	1	0	1	0	25	24
San Francisco	0	1	0	1	8	1	0	8	1	56	108

City reports for week ended Nov. 27, 1937—Continued

State and city	Meningococcus meningitis		Poliomyelitis cases	State and city	Meningococcus meningitis		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Rhode Island:				Maryland:			
Providence	1	0	0	Cumberland	1	0	0
New York:				West Virginia:			
Buffalo	0	0	1	Wheeling	1	1	0
New York	2	0	2	North Carolina:			
Rochester	0	0	1	Winston-Salem	1	0	0
Syracuse	0	0	1	Georgia:			
New Jersey:				Atlanta	1	0	0
Newark	1	0	0	Tennessee:			
Trenton	1	0	0	Knoxville	1	0	0
Pennsylvania:				Louisiana:			
Philadelphia	2	0	0	New Orleans	0	0	2
Ohio:				Texas:			
Cincinnati	2	1	0	Houston	0	0	1
Cleveland	1	0	0	Utah.			
Illinois:				Salt Lake City	0	0	1
Chicago	1	0	0	California:			
Minnesota:				Los Angeles	4	1	1
St. Paul	0	0	1	Sacramento	0	0	2
Missouri:				San Francisco	1	0	1
Kansas City	0	0	1				
St. Louis	0	0	1				

Encephalitis, epidemic or lethargic—Cases: Providence, 1; New York, 2; Toledo, 1; Chicago, 1; St. Louis, 2.

Pellagra.—Cases: Baltimore, 1; Atlanta, 3; Tampa, 1. San Francisco, 1.

Typhus fever.—Cases: Minot, 1, Savannah, 2, Miami, 1, Nashville, 8; Houston, 1.

FOREIGN AND INSULAR

SWEDEN

Notifiable diseases—October 1937.—During the month of October 1937, cases of certain notifiable diseases were reported in Sweden as follows:

Disease	Cases	Disease	Cases
Cerebrospinal meningitis	7	Poliomyelitis	[1] 460
Diphtheria	37	Scarlet fever	1,319
Dysentery	64	Syphilis	24
Epidemic encephalitis	1	Typhoid fever	6
Gonorrhea	1,040	Undulant fever	12
Paratyphoid fever	10	Weil's disease	1

[1] Includes 80 cases nonparalytic at time of notification.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for November 26, 1937, pages 1738-1752. Similar cumulative tables will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Cholera

China.—During the week ended November 27, 1937, cholera was reported in China as follows: Hong Kong, 1 case; Shanghai, 10 cases.

French Indochina—Haiphong.—During the week ended November 27, 1937, 6 cases of cholera were reported in Haiphong, French Indochina.

India.—Cholera has been reported in India as follows: Week ended November 6, 1937, 1 case in Delhi; week ended November 27, 1937, 1 fatal case in Rangoon.

Plague

Hawaii Territory—Island of Hawaii—Hamakua District.—Plague-infected rats have been found in Hamakua District, island of Hawaii, Hawaii Territory, as follows: Hamakua Mill sector, 1 rat on November 24, and 2 rats on November 26; Paauhau sector, 1 rat on November 10, 1 rat on November 12, 1 rat on November 22, and 1 rat on November 24, 1937.

Peru.—During the month of October 1937, plague has been reported in Peru as follows: Lambayeque Department, 1 case, 1 death; Libertad Department, 2 cases, 2 deaths; Lima Department, 6 cases, 4 deaths.

Siam.—During the week ended October 2, 1937, 57 cases of plague with 57 deaths were reported in the Provinces of Siam.

Smallpox

Mexico.—During the month of September 1937, cases of smallpox were reported in Mexico, by States, as follows: Aguascalientes, 5; Campeche, 1; Chihuahua, 4; Coahuila, 2; Durango, 15; Guanajuato, 7; Hidalgo, 1; Jalisco, 5; Mexico, 3; Mexico, D. F., 11; Michoacan, 37; Nayarit, 1; Nuevo Leon, 2; Queretaro, 5; Sinaloa, 3; Tabasco, 1; Tlaxcala, 3; Vera Cruz, 2; Zacatecas, 1:

Typhus Fever

Chile—Iquique.—During the week ended November 6, 1937, 1 case of typhus fever was reported in Iquique, Chile.

Mexico.—During the month of September 1937, cases of typhus fever were reported in Mexico, by States, as follows: Aguascalientes, 1; Campeche, 2; Durango, 1; Guanajuato, 19; Hidalgo, 4; Jalisco, 2; Mexico, 29; Mexico, D. F., 29; Michoacan, 5; Puebla, 55; Queretaro, 3; San Luis Potosi, 6; Tamaulipas, 2; Tlaxcala, 3; Vera Cruz, 9; Zacatecas, 2.

Yellow Fever

Gold Coast—Tarkwa.—On November 25, 1937, 1 fatal case of suspected yellow fever was reported in Tarkwa, Gold Coast.

Ivory Coast—Gaoua.—On December 1, 1937, 1 suspected case of yellow fever was reported in Gaoua, Ivory Coast.

Nigeria—Wana.—On November 27, 1937, 2 cases of yellow fever were reported in Wana, Nigeria.

Paraguay—Asuncion.—On November 14, 1937, 1 case of yellow fever was reported in Asuncion, Paraguay. All precautionary measures have been taken.

Senegal—Diourbel.—On November 29, 1937, 1 suspected case of yellow fever was reported in Diourbel, Senegal.

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 52 DECEMBER 24, 1937 NO. 52

PREVALENCE OF COMMUNICABLE DISEASES IN THE UNITED STATES

November 7–December 4, 1937

The accompanying table summarizes the prevalence of eight important communicable diseases based on weekly telegraphic reports from State health departments. The reports from each State are published in the Public Health Reports under the section "Prevalence of Disease." The table gives the number of cases of these diseases for the 4-week period ending December 4, the number reported for the corresponding period in 1936, and the median number for the years 1932–36.

DISEASES ABOVE MEDIAN PREVALENCE

Measles.—The number of cases of measles (15,867) reported for the 4 weeks ended December 4 was more than twice the incidence of the preceding 4-week period. An increase in the disease is expected at this season of the year. Measles, however, has been at a relatively high level for several months, and the current incidence is about 4.6 times that for the corresponding period in 1936 and about 2.3 times the incidence for this period in 1935. The highest incidence was reported in the Central and Middle Atlantic sections, where the number of cases was approximately 10 times that for last year. The New England section alone reported a normal seasonal incidence.

Smallpox.—For the current period 910 cases of smallpox were reported, as compared with 333, 928, and 376 for the corresponding period in the years 1936, 1935, and 1934, respectively. The highest incidence is still confined to those regions where this disease has been unusually prevalent for the past 2 or 3 years, namely, the North Central, Mountain, and Pacific regions, but during recent weeks the incidence in the East South Central region has been considerably above normal. The North Atlantic region reported no cases, the South Atlantic 6 cases, and the West South Central 22 cases, an average normal expectancy.

Influenza.—The 4,995 cases of influenza reported exceeds only slightly the number reported for the corresponding period of 1936, which was a period of average seasonal incidence. The greater part of the increase during the current period was reported from the West South Central region.

Meningococcus meningitis.—During the current 4-week period, 279 cases of meningococcus meningitis were reported—approximately 75 percent of the number for the corresponding period in 1936. In 1935, 1934, and 1933, the numbers of cases for this period totaled 288, 129, and 157, respectively. While the incidence was low in relation to last year, it was considerably above the 1932-36 median for this period. A comparison of geographic regions shows that the disease was somewhat above the average seasonal level in the South Atlantic, South Central, and Pacific regions, low in the East North Central and Mountain regions, and about normal in the North Atlantic and West North Central regions.

DISEASES BELOW MEDIAN PREVALENCE

Diphtheria.—The number of cases of diphtheria (3,676) was the lowest reported during this period for the last 9 years. In 1936, 3,804 cases were reported during this period, and in 1935, 5,162 cases were reported. The West South Central and Mountain regions reported appreciable increases over last year, while the West North Central, East South Central, and South Atlantic regions reported significant decreases. The steady decline in diphtheria has been somewhat interrupted during the current year; and for the first time since the middle of the year the total number of cases for a 4-week period fell below that for the corresponding period of last year. The incidence has, however, remained well below the median level of preceding years.

Poliomyelitis.—The number of reported cases of poliomyelitis was lower than it was at this time last year in all sections of the country except the New England and Pacific regions. For the current period the number of cases totaled 312, as compared with 543, 509, and 332 for the corresponding period in 1936, 1935, and 1934, respectively. As compared with the experience of the years 1932–36, the incidence in the Middle Atlantic, South Atlantic, and East North Central regions was low, but in all other regions the number of cases remained above the normal seasonal level.

Typhoid fever.—For the country as a whole the incidence of typhoid fever continued to be low. For the 4 weeks ended December 4 there were 947 cases reported, which represents a decline of approximately 25 percent from last year's figure (1,245) for this period. In 1935, 1934, and 1933 the numbers of cases totaled 1,061, 1,482, and 1,376, respectively. The current incidence is the lowest recorded for this period in the 9 years for which these data are available.

Scarlet fever.—The number of cases (17,052) of scarlet fever was about 15 percent in excess of that for the corresponding period in 1936, but it was lower than the number reported in each of the 3

preceding years. In the Middle Atlantic, South Atlantic, East South Central, and Pacific regions the current incidence was below the normal seasonal incidence, but in all other regions it was relatively high. The New England States reported about a 35 percent increase over last year and the North Central regions a 25 percent increase. The 837 cases reported from the West South Central region was the highest number reported during this period in recent years.

Number of reported cases of 8 communicable diseases in the United States during the 4-week period Nov. 7–Dec. 4, 1937, the number for the corresponding period in 1936 and the median number of cases reported for the corresponding period 1932–36 [1]

Division	Current period	1936	5-year median	Current period	1936	5-year median	Current period	1936	5-year median	Current period	1936	5-year median
	Diphtheria			Influenza [2]			Measles [3]			Meningococcus meningitis		
United States [1]	3,676	3,804	5,239	4,495	3,650	3,685	15,867	3,477	8,598	279	378	221
New England	59	53	92	25	23	24	898	1,016	1,055	9	11	11
Middle Atlantic	352	312	499	104	94	77	6,264	766	2,141	39	66	40
East North Central	636	574	1,119	411	265	427	3,295	322	822	35	76	59
West North Central	306	349	545	168	325	258	1,901	144	767	21	25	17
South Atlantic	948	1,311	1,311	1,209	1,233	1,244	1,704	438	852	74	84	27
East South Central	409	553	832	699	466	430	627	74	124	57	51	17
West South Central	514	339	917	1,402	744	822	231	100	100	17	16	8
Mountain	238	76	106	278	219	185	637	441	556	7	21	15
Pacific	214	237	228	199	281	265	310	176	881	20	28	12
	Poliomyelitis			Scarlet fever			Smallpox			Typhoid fever		
United States [1]	312	543	332	17,052	14,695	17,714	910	333	408	947	1,245	1,245
New England	12	6	7	1,126	830	1,051	0	0	0	35	17	24
Middle Atlantic	35	46	51	2,837	2,677	3,311	0	0	0	136	195	177
East North Central	45	125	54	5,666	4,523	5,161	129	38	103	95	220	195
West North Central	49	50	29	2,776	2,246	2,016	334	129	113	65	125	94
South Atlantic	16	53	30	1,378	1,413	1,597	6	0	5	139	209	228
East South Central	31	53	19	696	657	892	62	1	9	77	185	184
West South Central	41	123	18	837	367	476	22	17	21	288	181	215
Mountain	15	29	12	815	799	799	191	84	68	70	63	75
Pacific	68	49	49	921	1,183	1,172	166	64	64	42	50	65

[1] 48 States. Nevada is excluded, and the District of Columbia is counted as a State in these reports
[2] 44 States and New York City. The median is for the years 1933–36 only, the data for 1932 are not comparable.
[3] 46 States. Mississippi and Georgia are not included.

MORTALITY, ALL CAUSES

The average mortality rate from all causes in large cities for the 4 weeks ended December 4, based on data received from the Bureau of the Census, was 11.2 per 1,000 inhabitants (annual basis). The rate was normal for this season of the year; the average rate for the corresponding period in the years 1932–36 was also 11.2.

EFFECT OF ADDITION OF DITHIOETHYLAMINE (CYSTINE AMINE) TO THE DIET OF THE ALBINO RAT

By W. H. Sebrell, *Surgeon*, R. H. Onstott and D. J. Hunt, *Passed Assistant Surgeons*, and R. D. Lillie, *Surgeon, United States Public Health Service, National Institute of Health*

Sullivan, Hess, and Sebrell (1931) reported that albino rats fed a 4-percent casein diet supplemented with 0.5 percent of a preparation of cystine amine dihydrochloride, melting at 203° C., showed greater gains in weight than rats fed on an unsupplemented 4-percent casein diet. However, the increase in body weight was not as great as that obtained by supplementing the diet with 0.5 percent cystine. They concluded that cystine amine could replace cystine to a considerable degree for the purpose of growth of young white rats. Mitchell (1935), using a paired feeding method, failed to confirm this finding and reported that the addition of a preparation of cystine amine, melting at 212° to 213° C., to a cystine-deficient diet definitely depresses its growth-promoting value. By calculation of the data published by Mitchell, the average daily gain in weight of the rats on his basal diet was 0.71 grams, on his basal diet plus cystine, 0.75 grams, and on his basal diet plus cystine amine, 0.64 grams. The basal diet contained 27.2 percent of dry skim-milk powder. Jackson and Block (1936), using a different experimental method and a recrystallized cystine amine with a melting point of 215°, also failed to confirm the finding of Sullivan, Hess, and Sebrell, and observed no appreciable increase in the body weight of rats on the addition of 0.448 percent of cystine amine to a basal diet containing 15 percent of whole milk powder. They conclude that cystine amine is devoid of growth-promoting properties under the stated conditions. Their report, however, is based on experimental data from only three rats, which they state were selected for the experiment because their body weights were most nearly stationary. In our experience normal, young albino rats show an appreciable gain in weight on the 4-percent casein diet, as indicated by the weight curves of the rats in figure 1. It was felt, therefore, that the difference in results might be due to differences in experimental technique, particularly since Jackson and Block did not repeat the experiment of Sullivan, Hess, and Sebrell.

It was decided, therefore, to duplicate as nearly as possible, with rat litter mates, the original experiments of Sullivan, Hess, and Sebrell. This could not be done exactly, since the same strain of rats was not always available and changes had been made in the stock diet of the rat-breeding colony. It was necessary also to use new lots of cystine amine dihydrochloride.[1] The first lot of cystine amine fur-

[1] The cystine amine dihydrochloride was prepared by Dr. M. X. Sullivan and Dr. W. C. Hess of Georgetown University. These experiments were made possible by their cooperation in furnishing us with the material.

nished us for the present experiment was reported by Sullivan and Hess to have been recrystallized (to a melting point of 219° C., corrected) from the cystine amine used in the experiment of Sullivan, Hess, and Sebrell. Later lots were reported also to have been made by the Gabriel synthesis and recrystallized. A melting point determination on the last lot furnished us gave sintering at 212° C. and melted at 214.5 to 215.5° C. (corrected). In view of the unexpected results obtained in the first animal experiment, additional experiments were added in order to secure further data on the nature of the bone changes that occurred.

Experiment I

Litter mates of young albino rats weighing from 45 to 54 grams each were separated into three lots of four rats each and placed in individual cages. The composition of the experimental diets used in all of the experiments is given in table I. One lot (1491) was offered the basal diet no. 349. One lot (1492) was offered the same diet with the addition of 0.5 percent cystine amine dihydrochloride (diet 364), and one lot (1493) was offered the same diet with the addition of 0.5 percent l-cystine (diet 349-A). Within 12 days two of the rats on the cystine amine diet (364) were dead with evidence of extensive bone changes on X-ray examinations, and a third was killed, when moribund, on the 15th day for a study of the pathology. The fourth rat died on the 24th day.

TABLE 1.—*Composition of diets*

Ingredient	Diet 349	Diet 349-A	Diet 364	Diet 470	Diet 471	Diet 472	Diet 473
	Percent	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*	*Percent*
Casein (purified) [1]	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Salt mixture [2]	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Cod liver oil [3]	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Cottonseed oil [4]	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Brewer's yeast (dried)	5.0	5.0	5.0	15.0	15.0	15.0	15.0
Cornstarch (commercial)	82.0	81.5	81.5	72.0	71.5	71.5	71.0
l-cystine (C. P.)		.5			.5		.5
Cystine amine (dihydrochloride)			.5			.5	.5

[1] Commercial casein leached for a week in daily changes of acidulated water, according to the method of McCollum, Simmonds, Shipley, and Park, Bull. Johns Hopkins Hosp. 33: 398 (1922).
[2] Prepared according to the method of Osborne and Mendel, J. Biol. Chem. 37 557 (1919).
[3] U. S. P.
[4] Wesson Oil.

Two of the rats on the cystine diet (349-A) were changed to the cystine-amine diet (364) on the 14th day of the experiment. They steadily lost weight and were dead on the 30th day and 41st day respectively, following the change in diet, while the remaining two rats continued to gain steadily in weight to the end of the experiment, on the 65th day. On the 65th day two of the rats on the basal diet (349) were changed to the cystine-amine diet (364). These animals had gained 69 and 64 grams, respectively, from the beginning of the

experiment. Following the change to the cystine-amine diet they steadily lost weight until the experiment was terminated on the 103d day. This was 38 days after the change to the cystine-amine diet (364), during which time they lost 51 and 42 grams, respectively, in body weight, while the controls continued to gain slowly as shown in figure 1.

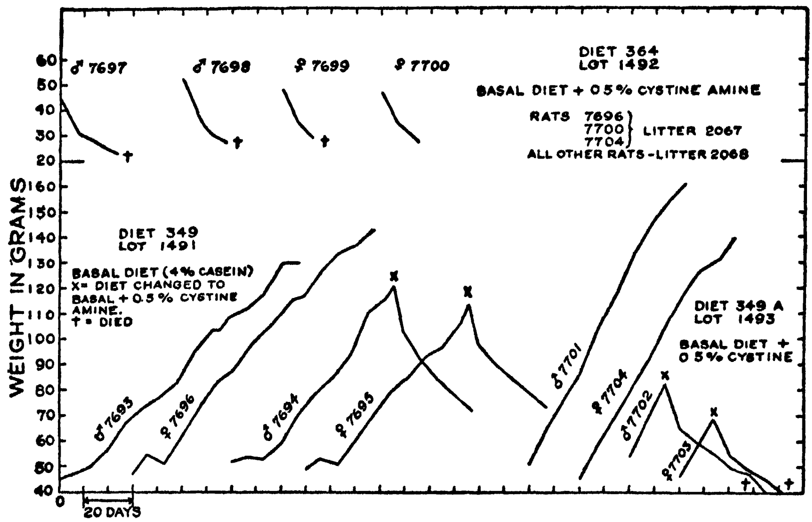

FIGURE 1.—Individual weight curves for rats in Experiment I.

Experiment II

Experiment I was repeated with three additional lots of litter mates of four rats each, as indicated in figure 2, without making any change in the diets of the control animals. Two of the rats on the cystine-amine diet (364) died on the 18th and 21st days, respectively, after a rapid and progressive loss in weight, and at autopsy showed extensive bone changes, which were confirmed by X-ray examinations. The remaining two rats were killed on the 21st day, when they were in very bad condition, having lost 26 and 25 grams, respectively, in body weight since the beginning of the experiment. The lot on the basal diet (349) gained from 11 to 21 grams in body weight during the same period, while the lot on the cystine diet (349–A) gained from 23 to 37 grams.

Experiment III

In order to eliminate the possibility of too small an amount of yeast being a factor, and also to obtain further proof as to the cause of death of the animals on the cystine-amine diets, an additional experiment was run with four lots of litter mates as indicated in figure 3.

One lot (1602) was offered diet 470, which is identical with our basal diet 349, except that the dried brewer's yeast is increased to 15 percent and the cornstarch correspondingly reduced.

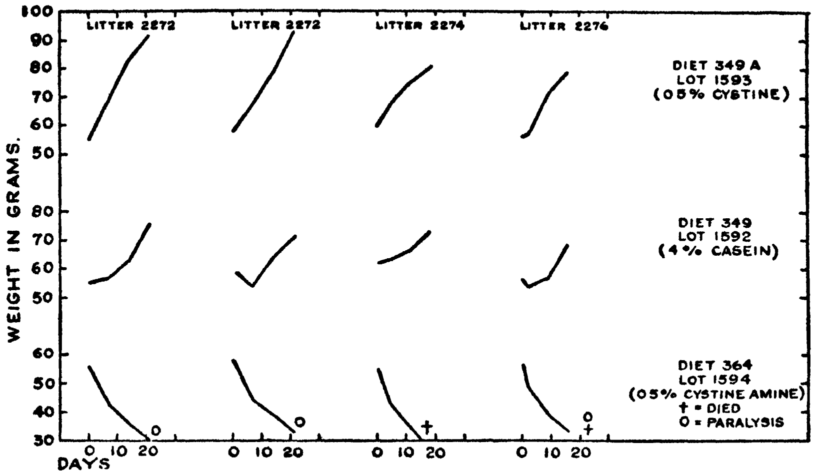

FIGURE 2.—Individual weight curves for rats in Experiment II.

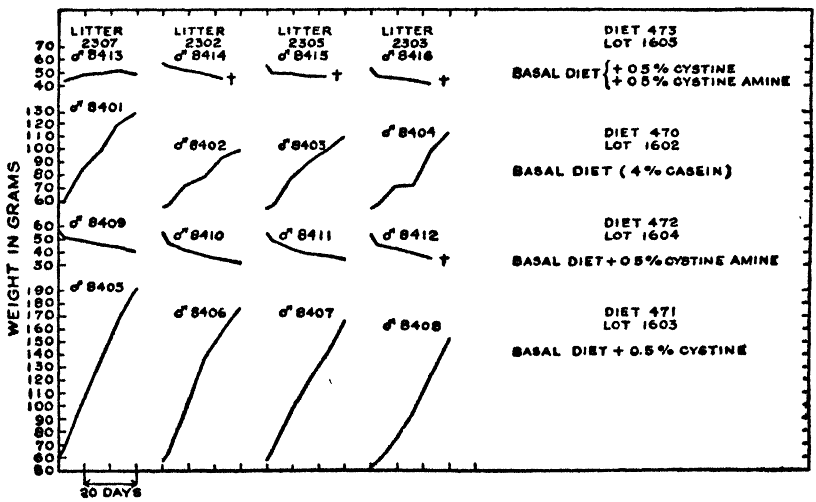

FIGURE 3.—Individual weight curves for rats in Experiment III.

There was a considerable difference between the rate of growth of these animals and those on diet 349. At the end of the 30-day experimental period the four rats had gained 70, 44, 56, and 69 grams, respectively.

One lot (1603) was offered a similar diet containing 0.5 percent cystine (471). The gains in body weight were also greater than those obtained by supplementing diet 349 with an equal amount of cystine.

At the end of the 30-day experimental period the four rats had gained 132, 120, 109, and 101 grams, respectively.

One lot (1604) was offered a similar diet containing 0.5 percent cystine-amine dihydrochloride (472). One rat was found dead on the 28th day of the experiment after losing 19 grams in weight, and at the end of the 30-day experimental period the remaining three animals had lost 18, 21, and 24 grams in weight, respectively, and at autopsy showed marked fragility of the femurs with excessive callus formation. X-ray examination revealed much more widespread bone changes.

In view of the consistently large gains in weight obtained by adding cystine to the basal diet, it was felt that the possibility of the effect of factors other than the cystine amine might be eliminated by the use of a diet containing both cystine and cystine amine. Accordingly, one lot (1605) was fed diet 473, which contains both 0.5 percent cystine and 0.5 percent cystine amine. All four of the experimental animals died in 24, 26, 29, and 32 days after a loss in body weight of 12, 8, 12, and 10 grams, respectively, and showed the bone lesions, which were confirmed by X-ray examination.

In all of the above-reported experiments the rats that received the cystine amine showed evidence of serious and extensive bone changes, which were manifested before death either as enlargement of the knee joints or apparent partial or complete paralysis of the hindquarters. At autopsy the femurs and tibiae were found to be exceedingly soft and fragile. In at least one instance there was irregular, soft, callus formation and a spontaneous fracture of the femur had occurred. X-ray photographs, revealed more extensive generalized bone changes than had been suspected before death. Comparative X-ray photographs are shown in figures 4–7.

Pathologic Histology

By R. D. Lillie, *Surgeon*

Histologic studies were made on material from 28 rats. Eight of these had received the basal diet alone, 4 with the addition of cystine, 12 with the addition of the "cystine amine" under study, and 4 with the addition of both cystine and "cystine amine."

In the first 12 of these rats the diaphyseal cortex of the bones studied was thick and compact, the metaphyses showed regular parallel columns of ossifying bone applied to the smooth and regular epiphyseal cartilages, the epiphyses contained a moderate amount of cancellous bone and possessed a more or less complete cortical layer of bone against the articular and epiphyseal cartilages, the marrow was generally of cellular type, and the periosteum showed relatively minor amounts of subperiosteal fibroblast proliferation in the metaphyseal regions.

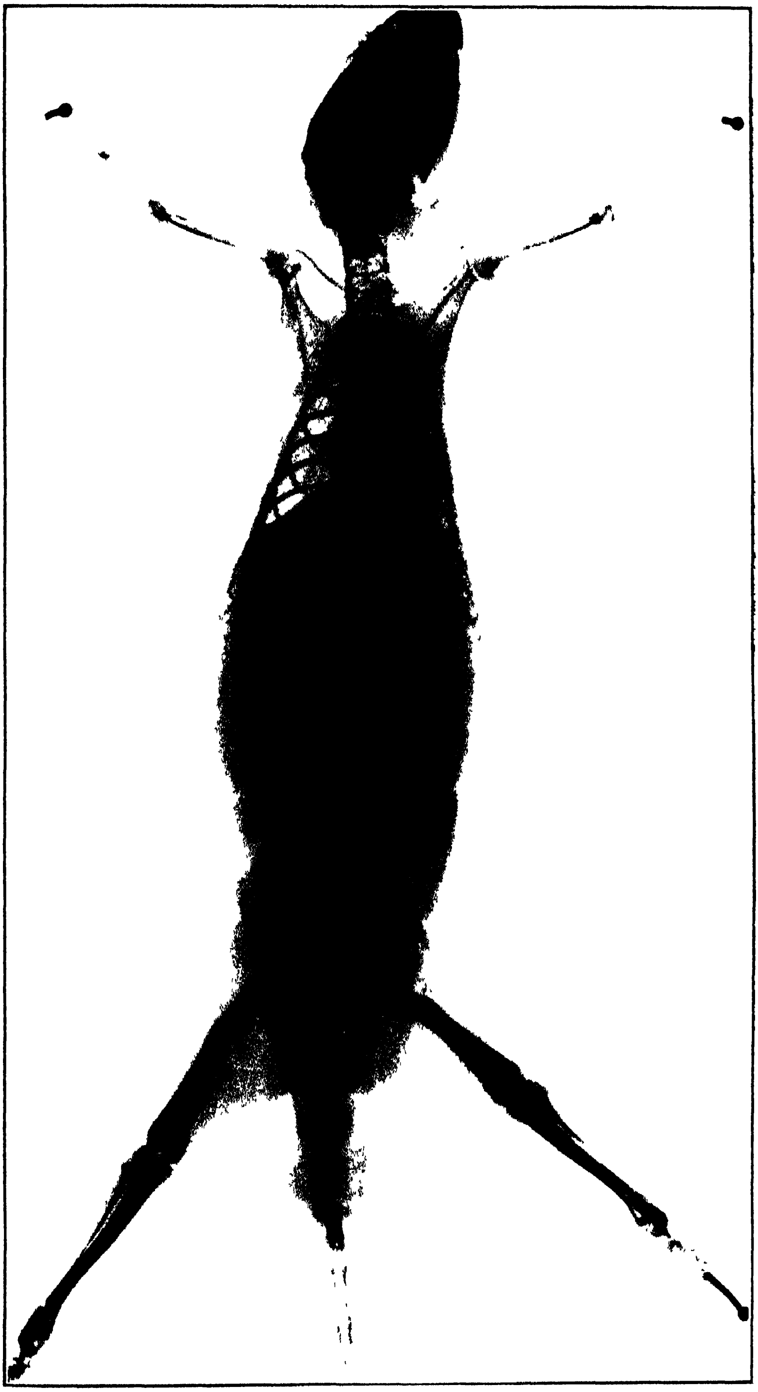

FIGURE 1.—Rat 8404 (lot 1602) from Experiment III. Basal diet.

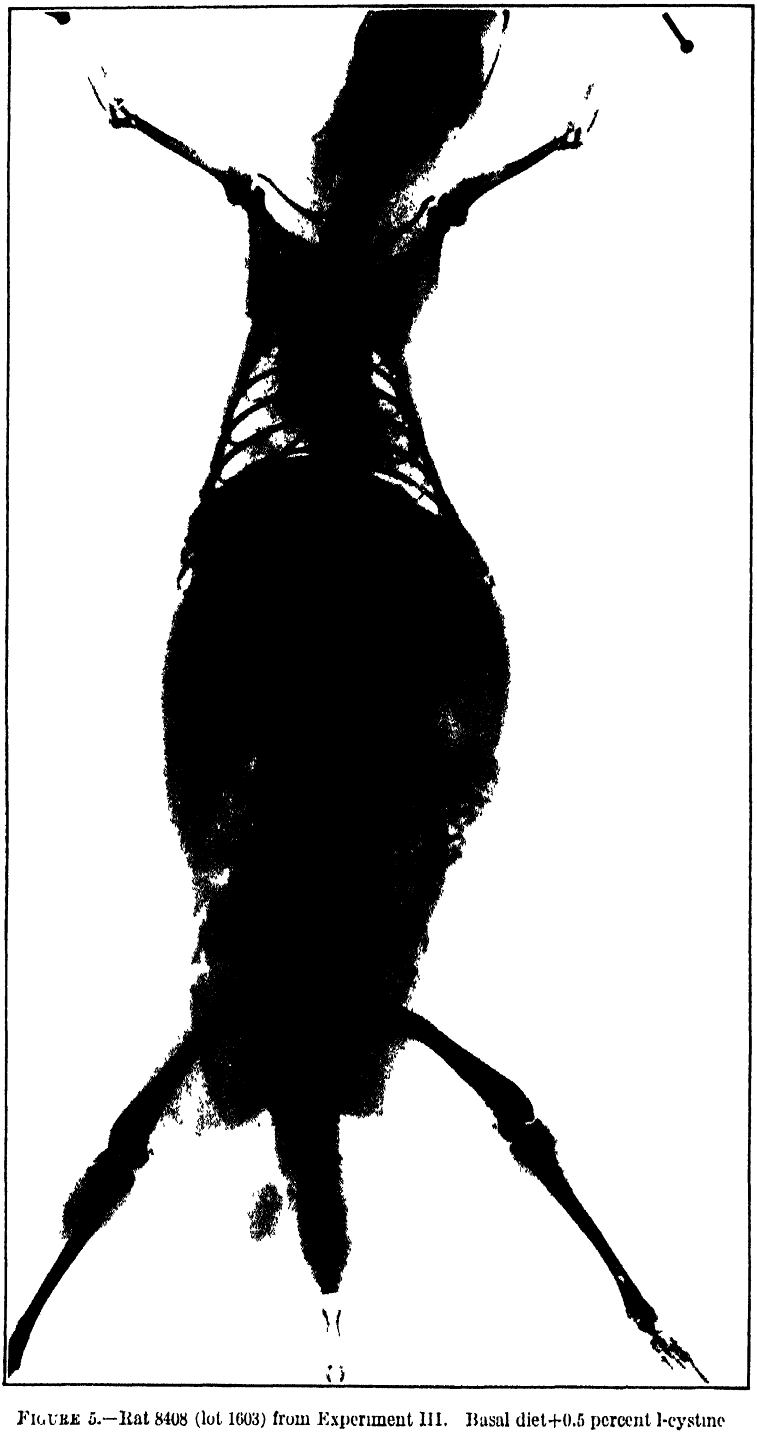

FIGURE 5.—Rat 8408 (lot 1603) from Experiment III. Basal diet+0.5 percent l-cystine

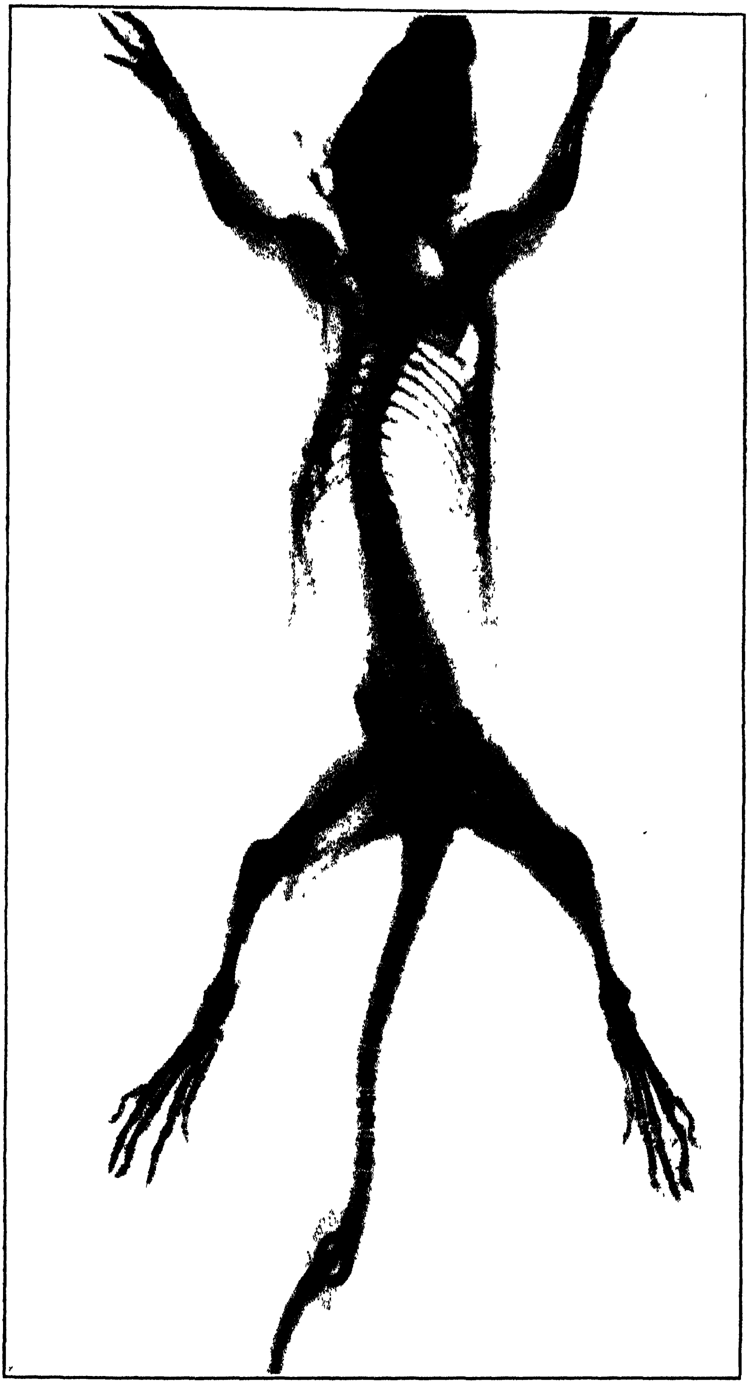

FIGURE 6 - Rat 8412 (lot 1603) from Experiment III. Basal diet + 0 5 percent cystine amine.

FIGURE 7 —Rat 8413 (lot 1605) from Experiment III. Basal diet+0.5 percent cystine+0 5 percent cystine amine.

FIGURE 8.

FIGURE 9

FIGURE 10

FIGURE 11

FIGURE 8 —Tibia, diaphyseal cortex (Basal diet)
FIGURE 9 —Tibia, diaphyseal cortex. (Basal diet+0 5 percent cystine amine)
FIGURE 10 —Tibia, epiphyseal cartilage and metaphysis. (Basal diet)
FIGURE 11 —Tibia, epiphyseal cartilage and metaphysis (Basal diet+0.05 percent cystine amine.)

FIGURE 12

FIGURE 13

FIGURE 14

FIGURE 15

FIGURE 12.—Tibia, epiphyseal cartilage, higher magnification. (Basal diet.)
FIGURE 13—Tibia, epiphyseal cartilage, higher magnification. (Basal diet+0.05 percent cystine amine)
FIGURE 14.—Tibia, articular cartilage, proximal epiphysis. (Basal diet.)
FIGURE 15—Tibia, articular cartilage, proximal epiphysis. (Basal diet+0.05 percent cystine amine.)

FIGURE 16.

FIGURE 17

FIGURE 18.

FIGURE 19.

FIGURE 16 – Tibia, cortex and periosteum, proximal metaphysis. (Basal diet.)
FIGURES 17, 18, and 19 — Same region. (Basal diet +5 percent cystine amine.)

In the remainder, all of which received "cystine amine", with or without added cystine, a very different picture was produced. The bony shafts of the long bones are often thinned, externally eroded, perhaps partly cancellous in structure, and often covered by more or less fibroblast proliferation on the periosteal surface. Figures 8 and 9 (pl. V) illustrate the contrast in cortical thickness. Metaphyseal bony columns may be entirely absent or replaced by a thin transverse bony lamella separating the marrow cavity from the epiphyseal cartilage. Figures 10 and 11 (pl. V) illustrate this contrast. The epiphyseal cartilages may show central splitting with a little calcification, swelling, proliferation, and rarefaction proceeding to breaking down and fibrin exudation, perhaps perforation by masses of proliferating fibroblasts. Figures 12 and 13 (pl. VI) contrast the normal and degenerating epiphyseal cartilages. The cancellous bone in the epiphyseal cavities is often greatly reduced in amount, the trabeculae are thinner, and cortical bone may be completely lacking from the surfaces covered by the articular and epiphyseal cartilages. When uncovered by bone the inner surfaces of these cartilages may be quite ragged in outline, and the articular cartilage may be considerably thinned. Figures 14 and 15 (pl. VI) contrast a normal epiphysis with one from a "cystine-amine" fed rat. The bone marrow often shows a much reduced cellularity accompanied by congestion, edema, and more or less focal or diffuse hemorrhage.

The periosteum over the metaphyses from the epiphyseal cartilages to the nearby diaphyseal region shows the most striking changes. Small to bulky irregular masses of new tissue are formed, consisting of masses of proliferating fibroblasts, areas of precartilaginous and cartilaginous tissues, of osteoid tissue, and cancellous bone with fibroblastic marrow, any of these alone or in various combinations. Focal hemorrhages may be found in the deeper layers in some animals, and sometimes fibroblast proliferation occurs outside the fibrous periosteum in the attached muscles. This periosteal reaction is decidedly reminiscent of fracture callus, yet definite fractures are not often recognizable. One instance was recorded in which the greatly thinned shaft cortex was impacted into the metaphyseal surface of the epiphyseal cartilage. These periosteal changes (figs. 17, 18, and 19, pl. VII) are contrasted with the slight reaction in the normal rat (fig. 16, pl. VII).

The alterations appear to consist in bone atrophy and erosion, degeneration of epiphyseal cartilages and cessation of metaphyseal bone growth, accompanied by a compensatory periosteal callus formation, either with or without demonstrable pathologic fractures. The other organs showed little of interest. The splenic follicles were generally smaller, and fewer lymphoid cells, megakaryocytes, and normoblasts were seen in the pulp with "cystine amine" than with

the other diets. Heart, kidney, pancreas, and adrenal were essentially normal and similar in the two groups. Lung and liver generally showed moderate congestion in the control groups and were relatively anemic in the "cystine amine" rats.

DISCUSSION

These results fail to confirm the findings of Sullivan, Hess, and Sebrell (1931), of Mitchell (1935), or those of Jackson and Block (1936), in regard to the physiological action of cystine amine. The loss in weight and the extensive bone pathology which occurred consistently in the rats on cystine amine in the present experiments were not seen in the rats on a similar diet reported by Sullivan, Hess, and Sebrell. Mitchell fed his cystine-amine preparation for 28 days and found a constant gain in weight, which was, however, less than the weight gain on his basal diet. If bone changes had occurred during this time, they probably would have been evident. Jackson and Block fed their cystine amine for a period of about 14 days, which may not have been long enough for the bone lesions to develop to a noticeable degree under their experimental conditions, although the fact that 2 of their 3 rats did not lose weight while on the cystine amine suggests that their cystine amine also may have been different from the material used in the present experiments. We have observed the bone changes in a group of 4 rats fed a basal diet similar to that used by Jackson and Block, supplemented by 0.5 percent of our present cystine-amine preparation.

The basal condition of the rats in the experiments herein reported do not exactly duplicate those of the experiments of Sullivan, Hess, and Sebrell. In addition to the change in the strain of rats and the change of the stock diet, the constituents of the basal experimental diets were necessarily from new lots of materials, which, however, were prepared in an identical manner. It seems doubtful that these changes could account for the difference in the results obtained.

In view of the striking bone changes obtained with our present preparation of cystine amine dihydrochloride, it would appear that any conclusion as to the physiological action of cystine amine is unjustified until further work is done.

CONCLUSION

Young albino rats on a low casein diet fed a substance furnished us as cystine amine dihydrochloride by Sullivan and Hess, rapidly lost weight and died. There was extensive bone pathology which appeared to consist of bone atrophy and erosion, degeneration of epiphyseal cartilages, cessation of metaphyseal bone growth, and compensatory periosteal callus formation.

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THE USE OF PURE STRAIN ANIMALS IN STUDIES ON NATURAL RESISTANCE TO TRANSPLANTABLE TUMORS [1]

By H. B. ANDERVONT, *Biologist, United States Public Health Service*

It is known that the growth of some transplantable tumors within the tissues of mice will induce immunity to subsequent reinoculation of the same tumor and other transplantable growths. This kind of resistance is known as concomitant immunity and has been discussed fully by Woglom (*17, 18*) in his reviews on immunity to transplantable tumors.

There are several factors which are usually regarded as influencing the immunity induced in experimental animals by the growth of transplantable neoplasms. One is the inherent immunizing property of the tumor itself—Russell (*15*) found that some propagable tumors produce resistance in mice while others do not. Another is variation in the growth energy of the immunizing tumor. It is generally agreed that such a tumor, when growing slowly, fails to induce immunity to the same extent that it does when it undergoes normal development. Still another factor, and one which is concerned with the investigations to be reported at this time, is the constitution of the inoculated animals. In an earlier paper (*1*), dealing with concomitant resistance produced in mice by caudal inoculation of sarcoma 180, it was stated that mice highly susceptible to the tumor were unable to acquire immunity to the same extent as others which possessed some degree of natural resistance. In a later publication (*2*), it was noted that when inbred mice were used as test animals the results showed that the genetic constitution of the inoculated animals is of prime importance in the development of concomitant immunity. Bittner (*10*) has found that inbred stocks of mice gave pronounced differences in the growth rate of sarcoma 180 when inoculated subcutaneously at different sites. Six strains of mice which had been inbred brother-to-sister for at least 25 generations were used in his investigations, and it is clearly shown that strains of mice possessing a high degree of natural resistance to sarcoma 180 were more readily immunized than strains exhibiting a low degree of natural resistance.

The present studies were prompted by an observation made during a series of experiments (*3*) in which mice of strain M were inoculated cutaneously with sarcoma 37, when it was found that in these mice the

[1] From the Office of Cancer Investigations, U. S. Public Health Service, Harvard Medical School, Boston, Mass.

tumor grew rapidly in the skin for about 10 days, after which it receded spontaneously. This suggested the possibility of the use of tumors growing within the skin of mice as a test for the relative susceptibility of various inbred strains. Hence, this paper deals with the results of experiments in which two well-known propagable sarcomas were grown cutaneously in highly inbred strains of mice.

EXPERIMENTAL ANIMALS

Some of the mice were obtained from the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Maine, while others were raised in this laboratory from litters procured from the Bar Harbor Laboratories. A brief description of the strains is presented in order to acquaint the reader with the extent of inbreeding and the susceptibility of the strains to the development of spontaneous neoplasms.

Strain A.—Inbred since 1918. The mice have undergone over 40 generations of inbreeding, and breeding females are susceptible to the development of spontaneous mammary gland tumors while both males and females exhibit a high incidence of spontaneous pulmonary growths.

Strain D.—Inbred since 1909. These mice are better known as the "Little dilute browns", and the breeding females develop spontaneous mammary carcinomas. The strain has been inbred for over 75 generations.

Strain C_3H.—Inbred since 1920. The strain has been inbred for over 40 generations and the breeding females exhibit a high incidence of spontaneous mammary gland carcinomas.

Strain C57 brown.—Inbred since 1921. Over 40 generations of inbreeding, with a medium incidence of tumors in breeding females.

Strain C57 black.—Inbred since 1921. Over 40 generations of inbreeding, with a very low incidence of spontaneous tumors.

Strain M.—Inbred since 1921. Better known as the "leaden strain," with over 40 generations of inbreeding and a medium to low incidence of spontaneous tumors. It should be mentioned that mice of the C57 brown, C57 black, and M strains are related.

Strain C.—Approximately 40 generations of inbreeding. The spontaneous tumor incidence is unknown.

Strain Y.—Inbred since 1925. Over 15 generations of inbreeding. There is a medium incidence of breast tumors in the females and a relatively high occurrence of spontaneous sarcoma of various types.

Strain I.—Inbred since 1927. The mice carry five recessive characters; namely, pink-eyed, dilute, brown, non-agouti, and piebald. Up to the present time no information has been presented as to the occurrence of spontaneous tumors in this stock.

The foregoing information has, for the most part, been obtained from publications and reports of the Roscoe B. Jackson Memorial

Laboratory. Mice of strains A, D, and M were obtained directly from that laboratory, while mice of strains C_3H, C57 brown, C57 black, C, and I were raised in this laboratory. All information regarding strain I mice was obtained from Dr. L. C. Strong, who originated the strain. All mice used in these investigations were approximately 3 months of age.

STRAINS OF TUMOR EMPLOYED

Two well-known inoculable mouse sarcomas were used. One of these, sarcoma 37, is known (*13*) as a rapidly growing tumor which induces a high degree of resistance in ordinary "market" mice. The other, sarcoma 180, is a highly malignant growth originating in the Crocker Institute for Cancer Research and is also capable of inducing immunity in mice (*1*). Both tumor strains have been propagated in this laboratory during the past 6 years.

It is essential to record that, during the past 3 years, both these tumors have been propagated almost exclusively in strain D mice. This fact may have important bearings upon the outcome of the experiments to be described; for, while experience in this laboratory (*2*) has shown that strain D mice are excellent soil for the propagation of transplantable tumors, it is also known that, after growing within the tissues of this strain, the tumor appears to show a diminished growth energy when implanted back into other strains. The influence that serial passage of a transplantable tumor in one strain of mice exerts upon its power of proliferation in other strains may be a promising field for investigation.

TECHNIQUES EMPLOYED FOR TUMOR INOCULATION

Two sites of implantation, cutaneous and subcutaneous, were used throughout the work. The method employed for implanting tumor tissue into the skin of mice is as follows: The hair over the abdomen is shaved 24 hours prior to inoculation. Tumor tissue free from necrotic material is passed through a fine mincing machine and inoculated by the use of a 1-cc tuberculin syringe and an 18- or 20-gage needle. Best results are obtained by inserting the needle just beneath the skin so that its bevel is plainly visible, and expelling a small amount of the minced tissue from the syringe. This method is referred to as cutaneous inoculation, and the resulting growths are designated as cutaneous tumors throughout this paper.

It is a little difficult to describe the site of growth following cutaneous inoculation. Obviously, it cannot be called intracutaneous, because of the thin epidermal layer of the mouse's skin and the fact that the tumors grow beneath the skin. Experience has shown that successful inoculation has been accomplished when the tumor is adherent to the skin but not adherent to the tissues over the abdomen, as revealed by

the ease with which it can be moved about. A tumor covered with loose skin and firmly imbedded beneath the skin should be regarded as growing subcutaneously.

Subcutaneous inoculations were all made into the right axillary region by the usual trocar technique. This method is referred to as subcutaneous inoculation, and the resulting growths are designated as subcutaneous tumors throughout this communication.

EXPERIMENTAL OBSERVATIONS

THE RESULTS OF CUTANEOUS INOCULATION WITH SARCOMA 37

Experiment 1.—On November 5, 1936, 176 mice representing strains M, C57 black, Y, C, I, C57 brown, C_3H, A, and D were inoculated cutaneously with sarcoma 37. One week later all the mice had well-developed cutaneous tumors, but there were apparent differences between the size of the tumors in the various strains. The strains were listed according to the size of the tumor by dividing them into four groups, with those having the largest tumors in group 1 and the smallest in group 4, as follows: Group 1—strains M, C57 black, and C57 brown; group 2—strains Y and A; group 3—strains C_3H and D; group 4—strains C and I.

Two weeks after inoculation the tumors were again examined and measured. Scab formation and dry hard tumors, which indicated regression were apparent in strains M, C57 black, C57 brown, I, C_3H, and A, while in strains Y, C, and D the tumors appeared to be growing progressively.

Three weeks after inoculation most of the tumors had regressed completely in strains M, C57 black, C57 brown, I, C_3H, and A, while those of the other 3 strains were growing and causing the death of the animals.

On December 2, 1936, all mice in which the tumor had receded spontaneously were tested for immunity by subcutaneous inoculation with sarcoma 37, and most of them were found to be resistant.

The results of the experiment can be summarized briefly as follows: The cutaneous tumors grew rapidly for about 10 days and then receded spontaneously in mice of strains M, C57 black, C57 brown, I, C_3H, and A, but grew progressively and killed the mice of strains Y, C, and D.

Experiment 2.—On December 11, 1936, mice of strains C, Y, I and M, totalling 39 animals, were inoculated cutaneously with sarcoma 37 in an effort to repeat experiment 1, and the results were practically identical with those of the earlier experiment. The tumor grew in all strains, receded in mice of strains M and I, but caused the death of all mice of strains C and Y. The surviving mice were subsequently tested for immunity by a single subcutaneous inoculation of sarcoma 37, and, as in experiment 1, practically all were resistant.

In order to present the results of experiments 1 and 2 without going into a lengthy description, they have been combined and are presented in table 1.

TABLE 1.—*Experiments 1 and 2. The results of cutaneous inoculation of pure-strain mice with sarcoma 37 and a subsequent immunity test*

Cutaneous inoculation—for natural resistance							Subcutaneous inoculation—for immunity		
Strain	Sex	Number of experiments	Number of mice inoculated	Average size of tumor, in mm, 2 weeks after inoculation	Number of mice killed by tumors [1]	Number of mice in which tumors regressed [1]	Number of mice tested	Number of mice immune	Per cent immune
M	F	1	12	14 by 11	0	12	12	12	100
M	M	2	21	14 by 11	1	20	20	6	30
C57 black	F	1	12	14 by 10	0	12	12	12	100
C57 black	M	1	12	18 by 10	0	12	12	11	92
Y	F	2	24	20 by 13	24	0			
Y	M	1	6	20 by 14	6	0			
C	F	1	12	17 by 10	12	0			
C	M	2	22	20 by 16	22	0			
I	F	1	8	4 by 4	0	8	8	8	100
I	M	2	18	4 by 4	0	18	18	18	100
C57 brown	F	1	14	14 by 10	0	14	14	13	92
C57 brown	M	1	12	14 by 10	0	12	12	12	100
C_3H	M	1	14	17 by 10	0	14	14	14	100
A	M	1	14	19 by 10	3	11	11	11	100
D	M	1	14	16 by 12	14	0			

[1] Final results 4 weeks after cutaneous inoculation.

In table 1 it is seen that mice of strains Y, C, and D did not possess sufficient natural resistance to the growth of sarcoma 37 to cause its recession, while the other six strains were capable of overpowering the tumor. Attention is directed to column 5 of the table, in which is given the average size of the cutaneous tumors in each strain 2 weeks after implantation. The first figure is the average length of the tumors measured from their anterior to posterior ends and the second, their width laterally. The thickness of the growths is omitted because practically all were approximately 4 to 5 mm. Actually the measurements given represent the size of the tumor in practically all mice of each strain, for the uniformity in size of the cutaneous tumors in a given strain of mice throughout their course of growth or regression is a striking phenomenon. In those strains in which the tumor grew progressively, it often attained a size of 35 by 35 mm or more and became so large that the entire body of the mouse was lifted off the floor of the cage. On the other hand, when the tumors receded in a resistant strain from growths measuring 14 by 10 mm or more, the skin appeared normal and hair overgrew the site at which the tumors had developed and receded.

Column 5 of the table also shows that 2 weeks after implantation the cutaneous tumors of strain I mice were smaller than in any other strain, showing that these mice had more natural resistance to the

growth energy of sarcoma 37 than any of the other strains. The ability of this strain to resist growth of sarcoma 37 will be discussed later in connection with the results obtained with sarcoma 180.

THE RESULTS OF SUBCUTANEOUS INOCULATION WITH SARCOMA 37

Table 1 also includes the results of a single subcutaneous immunity test for all mice in which sarcoma 37 receded spontaneously in the skin. Practically all the mice, with the exception of strain M males, were resistant to this test. The reason that these mice failed to resist the immunity test is not clear, but the results with strain M mice are in accordance with earlier findings (*1*) when it was observed that female "market" mice were more easily immunized than males by caudal growth of sarcoma 180. However, the numbers of mice used in the studies reported here are too small to justify any definite conclusion.

While performing subcutaneous inoculations of the various strains for the purpose of determining whether or not the animals were immune, a group of normal controls were employed. This experiment yielded further evidence of natural resistance on the part of those strains tested. The experiment is described below.

Experiment 3.—Only male mice of the different strains were used and all were inoculated subcutaneously with sarcoma 37 on December 2, 1936. Records were taken of the size of the tumor at weekly intervals. A summary of the findings is presented in table 2.

TABLE 2.—*Experiment 3. The results of subcutaneous inoculation of pure strain mice with sarcoma 37*

Strain	Number of mice inoculated	Average size of tumors, in mm, 2 weeks after inoculation	Number of mice killed by tumors [1]	Number of mice in which tumors regressed	Percent in which tumors regressed
M	10	21 by 17 by 13	5	5	50
C57 black	10	23 by 16 by 11	2	8	80
I	5	14 by 14 by 7	0	5	100
C57 brown	10	21 by 17 by 13	8	2	20
A	10	15 by 14 by 14	10	0	0
C_3H	10	18 by 10 by 8	5	5	50
C	9	21 by 18 by 15	9	0	0

[1] Final results 8 weeks after subcutaneous inoculation.

Briefly, the findings in experiment 3, as recorded in table 2, tend to confirm the results of experiments 1 and 2. With the exception of strain A animals, all the strains which had proved to be resistant to cutaneous growth of sarcoma 37 also possessed some natural resistance to the same tumor when grown within their subcutaneous tissues, while all the mice of strain C succumbed to tumor growth.

In dealing with subcutaneous tumors the results were not as clear cut as with cutaneous tumors, which indicates that cutaneous tumors were better test objects for the presence of natural resistance than were subcutaneous growths.

THE RESULTS OF CUTANEOUS INOCULATION WITH SARCOMA 180

In conformity with the proposed plan of investigation already mentioned, a group of mice from various strains was tested for natural resistance to sarcoma 180 when implanted cutaneously.

Experiment 4.—A group of 180 mice divided equally as to sex and representing mice of strains M, C57 black, Y, C, C57 brown, C_3H, A, and D was inoculated cutaneously with sarcoma 180 on October 30, 1936. Details of the experiment are omitted because the tumor grew progressively in the skin of all the mice and killed practically every animal within 6 to 8 weeks. The results of the experiment are of interest, when compared with those of experiments 1 and 2, for they show a pronounced difference in the susceptibility of the various strains to the growth of the two tumors.

It is seen that animals of strain I were not included in experiment 4. In view of the pronounced resistance exhibited by this strain of mice to the growth of sarcoma 37, experiments were performed in which they were tested for natural resistance to sarcoma 180.

Experiment 5.—On February 3, 1937, a group of 9 strain I male mice received cutaneous implants of sarcoma 180. All grew the tumor, and at the end of the second week the average tumor size was 17 by 9 mm. The tumors grew slowly, averaging 21 by 14 mm at the end of the fourth week. When examined at the conclusion of the fifth week only 2 appeared to be growing, while the other 7 had begun to recede. The tumors in these 7 mice continued to recede and all had regressed completely by 8 weeks after inoculation. The remaining 2 mice succumbed to tumor growth.

Experiment 6.—Eleven male and 11 female mice of strain I and 13 strain M females were given a cutaneous inoculation of sarcoma 180 on April 8, 1937. All the animals developed cutaneous tumors, and those in strain M mice grew progressively and killed all their hosts within 8 weeks. The tumors in the strain I mice, however, grew for about 2 weeks, attaining an average size of 11 by 5 mm, and then began to recede. By the end of the fifth week, 19 of the cutaneous growths had regressed completely. All the mice were refractory to subcutaneous implantation of sarcoma 180 on May 17, 1937.

THE RESULTS OF SUBCUTANEOUS INOCULATION WITH SARCOMA 180

Since strain I mice had proved to be resistant to sarcoma 180 when grown cutaneously, the next step was to determine whether the mice of this strain would prove to be resistant to the same tumor when it was inoculated subcutaneously. Mouse sarcoma 180 is known to be a very malignant growth. During the past 6 years it has been propagated in this laboratory and has grown progressively in practically all

27243°—37——2

the inoculated animals with less than 1 percent of spontaneous regressions.

Experiment 7.—On February 3, 1937, 20 strain I males and 10 strain D males were inoculated subcutaneously with sarcoma 180. The tumor grew progressively in all of strain D mice and in 18 of the strain I mice, all of which succumbed to tumor growth within 6 weeks after inoculation. In each of the last 2 mice of strain I the tumor attained a size of 24 by 18 by 12 mm within 3 weeks after implantation but then regressed slowly and was gone completely 10 weeks after inoculation.

Experiment 8.—Twenty-four strain I mice (12 males and 12 females) and 6 strain D males were inoculated subcutaneously with sarcoma 180 on April 8, 1937. All 6 of the strain D controls and 20 of the strain I animals died from tumor growth within 8 weeks. In 4 of the strain I animals, consisting of 2 males and 2 females, the tumor grew for about 3 weeks but then began to recede and was gone 2 months after inoculation.

The outcome of the above series of investigations with sarcoma 180 shows that mice of strain I possess more natural resistance to the growth of sarcoma 180 than any of the other strains tested.

DISCUSSION

The findings in respect to sarcoma 37 afford evidence of the importance of the constitution of the inoculated animals in their natural resistance to cutaneous growth of this tumor, for in practically all individuals of 6 strains the tumor regressed spontaneously and in practically all members of 3 strains it grew progressively and killed its hosts. The use of subcutaneous inoculation gave similar findings so far as these 9 strains of mice were concerned, but the results were far less clear cut than when the tumor was grown cutaneously. Hence it may be concluded that the cutaneous growth of this tumor is a better test for the natural resistance of inoculated animals than its subcutaneous growth.

Although 6 of the 9 strains of mice had sufficient natural resistance to overcome the growth of sarcoma 37 when inoculated cutaneously, only one of these strains was able to resist the growth of sarcoma 180 when implanted into the same site. This difference might be attributed to a difference in the growth energy of the two tumors. Strain I mice were the only animals whose natural resistance was sufficient to cause regression of sarcoma 180, which is of special interest in view of the fact that sarcoma 180 is one of the most malignant of inoculable mouse tumors. Here again the use of cutaneous inoculation demonstrated the natural resistance of strain I mice far better than when subcutaneous inoculation was employed.

Strain I mice are of exceptional interest. The findings recorded in this paper show that they are very resistant to two well-known propagable tumors, and in this laboratory they have proved to be resistant to the carcinogenic activity of lard solutions of 1:2:5:6-dibenzanthracene when injected subcutaneously. The details of this work will be published later, but it is mentioned here as evidence of the natural resistance of this strain of mice. However, it must not be concluded that all strains exhibiting a high degree of natural resistance to transplantable growths are also resistant to induced growths, for strain Y mice have also been found to be extremely resistant to lard solutions of both 1:2:5:6-dibenzanthracene and methylcholanthrene; but, as revealed in this communication, they are very susceptible to the growth of sarcoma 37 and sarcoma 180.

It is also evident from the outcome of these experiments that the susceptibility of a strain of mice to the development of spontaneous neoplasms is of little importance in their response to inoculation with these propagable tumors. It is believed that, from the evidence available thus far, it is impossible to state with certainty that a strain of mice is resistant or susceptible to tumor growth in general.

The observations recorded in this paper show that the genetic constitution of the inoculated animal had a pronounced influence upon its natural resistance to the growth of the transplantable tumors. This factor has long been recognized by experienced investigators in the field of propagable neoplasms. Russell (*15*) recognized it as early as 1912, and Woglom (*18*) has advised the use of pure strain animals in such investigations. Selbie (*16*) is one of the more recent investigators to arrive at the same conclusion. Starting with a group of rats which were relatively insusceptible to inoculation with the Jensen rat sarcoma, he obtained, by selective inbreeding, a stock which was far more susceptible. It was then found that the susceptible strain was also more susceptible to the growth of other propagable rat tumors than was the parent stock, an observation which is in accord with findings in this laboratory (*2*) as regards strain D mice, which have proved to be very susceptible to various propagable tumors. Furthermore, the high degree of natural resistance possessed by strain I mice to both sarcoma 37 and sarcoma 180, as recorded herein, supports the view that certain strains of animals might have a general resistance or susceptibility to transplantable growths. Selbie concluded that "consistent results in experiments with transplantable tumours can be obtained only by using pure strains of animals."

It is worthy of note, however, that, although strain D mice appear to be very susceptible to certain well-known tumors which can be propagated in most strains of mice, they are very resistant to most tumors arising spontaneously in other pure lines of mice. The im-

portant contributions made by geneticists in this respect have been reviewed by Bittner (*11*).

In dealing with the production of concomitant immunity in these experiments, it may be said that the findings in this respect are in accord with those expressed previously; namely, that a strain of mice possessing a high degree of natural resistance to the growth of a certain tumor is able to acquire resistance to a greater extent than those which possess little or no natural resistance. This conclusion is also in harmony with the findings of Bittner (*10*).

Besredka (*4–8*) and his colleagues have used cutaneous growths of transplantable tumors to produce concomitant immunity in both mice and rabbits. When inoculated into the skin, the tumors grew for a while and then receded spontaneously, after which the animals were found to be immune to subsequent reinoculation. Nozu (*14*) also recorded the spontaneous recession of a transplantable rabbit tumor, following inoculation into the skin. Bessemans and Asaert (*9*), as well as Flaks and Grynkraut (*12*), were less successful in obtaining spontaneous recession and immunity. The difference in the results of these various investigators might be due to differences in natural resistance of the stock of animals into which the tumors were implanted.

SUMMARY

Two propagable sarcomas of mice, sarcoma 37 and sarcoma 180, both of which had undergone serial passage in one strain of mice for 3 years, were used in these investigations.

Nine strains of inbred mice have been employed in a study on natural resistance to these 2 transplantable tumors. It was found that when sarcoma 37 was implanted cutaneously into these mice, it grew rapidly in all the strains, but practically all members of 6 strains possessed sufficient natural resistance to bring about its complete regression, while the tumor grew progressively and caused the death of practically all members of the 3 other strains. Most mice in which the tumor had regressed were resistant to subsequent subcutaneous inoculation with the same tumor.

When sarcoma 180 was implanted cutaneously, it grew progressively and killed practically all the mice of 8 of the strains, but receded spontaneously in the majority of individuals of strain I.

Strain I mice possessed a high degree of natural resistance to both tumors, for they were highly resistant to cutaneous growth of both sarcoma 37 and sarcoma 180, as well as subcutaneous growth of sarcoma 37, and about 10 percent of them were resistant to subcutaneous growth of sarcoma 180.

The results of these experiments show that the genetic constitution of the inoculated mice is an important factor in determining their natural resistance to the test tumors. It is also indicated that cutaneous tumors are excellent test objects for the presence of natural resistance to propagable neoplasms of mice.

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DENTAL CARIES IN AMERICAN INDIAN CHILDREN

Studies of certain characteristics of prevalence and severity of dental caries among different population groups suggest that epidemiological investigations may make important contributions to the development of public health methods for control of this disease. Data bearing on this subject are presented in a recent bulletin[1] issued by the Public Health Service, which gives the dental status of 8,257 American Indian children who are members of 110 different Indian tribes and who live on 76 reservations in 16 different States in the United States. Prevalence and severity of attack by caries for children of each tribe and for aggregates of tribes living in six widely separated geographic localities are found to be markedly different. The highest and lowest rates of attack appear, respectively, among children living in the extreme northwestern and southwestern sections of the country. Attempts to correlate the differences in caries with climatic and dietary factors are inconclusive, but implications of the

[1] Dental Caries in American Indian Children. By Henry Klein, Associate Pharmacologist, and Carroll E. Palmer, Passed Assistant Surgeon, U. S. Public Health Service. Public Health Bulletin No. 239. Government Printing Office, Washington, D. C.

findings are discussed and suggestions are made regarding further studies.

DEATHS DURING WEEK ENDED DECEMBER 4, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Dec. 4, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	8,604	8,742
Average for 3 prior years	8,003	
Total deaths, first 48 weeks of year	411,018	411,884
Deaths under 1 year of age	565	527
Average for 3 prior years	510	
Deaths under 1 year of age, first 48 weeks of year	26,335	26,580
Data from industrial insurance companies:		
Policies in force	69,983,032	68,816,785
Number of death claims	13,230	11,873
Death claims per 1,000 policies in force, annual rate	9.9	9.0
Death claims per 1,000 policies, first 48 weeks of year, annual rate	9.7	9.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers.

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (......) indicate that cases or deaths may have occurred although none was reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 11, 1937, and Dec. 12, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 11, 1937	Week ended Dec. 12, 1936	Week ended Dec. 11, 1937	Week ended Dec. 12, 1936	Week ended Dec. 11, 1937	Week ended Dec. 12, 1936	Week ended Dec. 11, 1937	Week ended Dec. 12, 1936
New England States:								
Maine	2	1	1	......	42	37	0	1
New Hampshire	......	......	......	......	45	15	0	0
Vermont	2	......	......	......	144	......	0	0
Massachusetts	2	3	......	......	76	316	2	5
Rhode Island	......	......	......	......	1	12	0	0
Connecticut	7	2	5	2	9	93	2	0
Middle Atlantic States:								
New York	36	37	[1] 13	[1] 14	93	203	5	9
New Jersey	12	22	14	30	581	86	1	3
Pennsylvania	30	35	......	......	2,048	49	5	7
East North Central States:								
Ohio	44	24	23	25	249	20	6	11
Indiana	33	33	41	34	55	11	0	3
Illinois	37	33	30	45	754	15	1	2
Michigan	25	14	1	......	238	34	1	1
Wisconsin	5	6	42	25	68	17	0	1
West North Central States:								
Minnesota	4	6	2	......	9	41	1	0
Iowa	3	3	3	2	3	3	0	2
Missouri	37	15	74	55	913	1	1	1
North Dakota	2	2	6	......	1	1	0	0
South Dakota	......	......	......	......	......	......	0	0
Nebraska	7	2	......	......	1	1	1	0
Kansas	9	12	10	3	37	6	1	5
South Atlantic States:								
Delaware	1	......	......	......	3	21	0	1
Maryland [2]	23	15	15	10	14	111	2	5
District of Columbia	7	5	3	......	6	1	0	1
Virginia	31	33	......	......	84	32	5	2
West Virginia	16	25	12	77	101	16	6	11
North Carolina [3]	44	76	7	6	396	18	4	5
South Carolina [3]	6	14	377	410	55	30	3	1
Georgia [4]	14	36	......	......	......	......	1	4
Florida [3]	23	7	9	6	42	6	0	1
East South Central States:								
Kentucky	17	29	15	29	83	10	0	8
Tennessee	27	23	81	93	168	4	1	2
Alabama [3]	27	36	192	189	17	2	11	1
Mississippi [3]	11	17	......	......	......	......	0	2

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 11, 1937, and Dec. 12, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec 11, 1937	Week ended Dec. 12, 1936	Week ended Dec. 11, 1937	Week ended Dec. 12, 1936	Week ended Dec. 11, 1937	Week ended Dec. 12, 1936	Week ended Dec. 11, 1937	Week ended Dec. 12, 1936
West South Central States:								
Arkansas	15	6	82	47	43	2	0	1
Louisiana	28	14	323	9	1	2	1	1
Oklahoma [4]	24	5	44	51	3	4	1	2
Texas [3]	46	78	368	556	64	61	6	1
Mountain States:								
Montana	-------	2	-------	18	11	-------	0	0
Idaho	2	1	5	11	13	133	0	1
Wyoming	-------	-------	-------	-------	1	-------	0	0
Colorado	9	8	-------	-------	44	6	0	0
New Mexico	7	1	-------	3	84	54	0	1
Arizona	2	7	92	46	-------	70	1	0
Utah [2]	-------	-------	-------	-------	81	4	1	0
Pacific States:								
Washington	3	8	-------	4	9	17	1	0
Oregon	7	1	21	44	12	8	0	2
California	20	52	52	127	28	13	2	2
Total	707	749	1,963	1,971	6,730	1,586	73	106
49 weeks of year	26,043	26,790	286,700	151,724	276,131	277,862	5,146	7,073

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Dec 11, 1937	Week ended Dec 12, 1936	Week ended Dec 11, 1937	Week ended Dec 12, 1936	Week ended Dec 11, 1937	Week ended Dec 12, 1936	Week ended Dec 11, 1937	Week ended Dec. 12, 1936	Week ended Dec 11, 1937
New England States:									
Maine	0	1	36	29	0	0	2	1	55
New Hampshire	0	0	24	11	0	0	0	1	2
Vermont	0	0	15	2	0	0	0	0	18
Massachusetts	0	0	174	158	0	0	6	2	217
Rhode Island	0	0	23	11	0	0	0	1	15
Connecticut	0	0	64	44	0	0	0	2	78
Middle Atlantic States:									
New York	2	0	405	453	0	8	7	9	388
New Jersey	0	0	103	84	0	0	3	2	133
Pennsylvania	2	1	421	364	0	0	19	27	323
East North Central States:									
Ohio	2	7	379	320	2	1	1	3	155
Indiana	1	0	181	152	41	3	5	3	18
Illinois	2	4	557	381	14	0	0	1	87
Michigan	1	2	416	370	0	2	0	11	175
Wisconsin	2	0	200	247	2	17	0	0	163
West North Central States:									
Minnesota	4	1	168	144	30	8	0	0	45
Iowa	1	1	184	94	46	11	0	1	31
Missouri	2	2	273	145	12	1	10	2	41
North Dakota	0	0	20	88	22	5	0	0	12
South Dakota	0	0	18	44	0	15	0	0	31
Nebraska	0	0	27	63	0	1	1	1	5
Kansas	0	5	151	214	5	13	0	9	77
South Atlantic States:									
Delaware	0	0	5	16	0	0	0	3	14
Maryland [2]	0	1	68	62	0	0	3	5	48
District of Columbia	0	0	12	10	0	0	2	1	4
Virginia	1	0	55	55	0	0	2	14	107
West Virginia	0	0	92	55	0	0	1	4	77
North Carolina [3]	0	0	59	65	0	0	4	9	246
South Carolina [3]	0	0	4	8	0	0	0	3	41
Georgia [3]	2	4	24	55	1	0	3	6	11
Florida [3]	0	0	6	5	3	0	2	3	1

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 11, 1937, and Dec. 12, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Dec. 11, 1937	Week ended Dec. 12, 1936	Week ended Dec. 11, 1937	Week ended Dec. 12, 1936	Week ended Dec. 11, 1937	Week ended Dec. 12, 1936	Week ended Dec. 11, 1937	Week ended Dec. 12, 1936	Week ended Dec. 11, 1937
East South Central States:									
Kentucky	1	1	68	68	0	0	1	9	58
Tennessee	[5] 2	3	45	54	2	0	3	14	34
Alabama [3]	0	1	18	27	0	0	2	3	19
Mississippi [2]	3	2	12	11	0	0	0	1	-------
West South Central States.									
Arkansas	1	4	28	5	2	0	2	5	15
Louisiana	0	1	8	8	0	0	8	4	7
Oklahoma [4]	1	3	54	23	3	0	9	7	22
Texas [3]	7	4	100	130	2	0	24	14	131
Mountain States.									
Montana	0	0	30	68	28	18	3	3	24
Idaho	0	0	33	52	23	2	1	2	13
Wyoming	0	0	12	8	9	5	0	2	8
Colorado	0	2	27	66	22	4	2	0	9
New Mexico	1	3	16	15	0	0	7	13	29
Arizona	0	1	5	13	2	0	0	4	-------
Utah [2]	1	0	51	18	1	0	0	0	12
Pacific States									
Washington	1	0	67	57	39	9	0	1	86
Oregon	0	0	54	34	13	52	2	2	42
California	3	13	230	252	2	0	9	8	387
Total	43	67	5,022	4,658	326	175	144	216	3,514
49 weeks of year	9,359	4,407	209,505	219,399	10,097	6,953	14,699	14,252	-------

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Dec. 11, 1937, 36 cases, as follows. North Carolina, 1; South Carolina, 3; Georgia, 19; Florida, 2; Alabama, 5, Texas, 6.
[4] Figures for 1936 are exclusive of Oklahoma City and Tulsa.
[5] 1 nonparalytic case included.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
October 1937										
Colorado	7	37	1	-------	91	-------	22	85	9	16
November 1937										
Arkansas	1	99	114	285	31	14	10	117	30	54
California	12	142	110	7	157	5	65	606	20	35
Colorado	1	29	-------	-------	115	-------	9	131	13	3
Delaware	0	1	-------	-------	1	-------	0	37	0	4
District of Columbia	8	33	1	-------	12	-------	0	54	0	1
Idaho	1	9	13	1	51	-------	1	104	41	3
Iowa	5	17	2	-------	17	-------	22	746	152	7
Maine	0	4	6	1	154	-------	2	104	0	6
Massachusetts	5	9	-------	-------	282	-------	6	593	0	16
Missouri	6	196	119	23	1,921	1	14	791	31	35
Nebraska	3	22	17	-------	8	-------	13	117	1	5
New Jersey	8	86	55	1	949	-------	4	296	0	16
Tennessee	17	106	229	37	310	9	6	209	14	29
West Virginia	12	96	96	-------	313	2	1	404	0	23
Wyoming	0	-------	-------	-------	2	-------	0	35	20	2

Summary of monthly reports from States—Continued

October 1937	Cases
Colorado:	
Chicken pox	111
Dysentery (bacillary)	8
Encephalitis (epidemic or lethargic)	2
Mumps	24
Paratyphoid fever	1
Whooping cough	43

November 1937	Cases
Actinomycosis:	
California	2
Tennessee	1
Anthrax:	
New Jersey	1
Chicken pox:	
Arkansas	39
California	1,065
Colorado	223
Delaware	37
District of Columbia	59
Idaho	150
Iowa	332
Maine	327
Massachusetts	972
Missouri	243
Nebraska	111
New Jersey	1,520
Tennessee	168
West Virginia	233
Wyoming	109
Conjunctivitis:	
Idaho	1
Dysentery:	
Arkansas (amoebic)	3
Arkansas (bacillary)	3
California (amoebic)	20
California (bacillary)	55
Colorado	1
Delaware (bacillary)	1
Massachusetts (bacillary)	37
Missouri	10
New Jersey (bacillary)	3
Tennessee (bacillary)	12
Encephalitis, epidemic or lethargic:	
California	1
District of Columbia	1
Iowa	3
Massachusetts	3
Missouri	8
New Jersey	1
Food poisoning:	
California	58
German measles:	
California	61
Idaho	1
Iowa	5
Maine	4

November 1937—Continued	Cases
German measles—Contd.	
Massachusetts	39
New Jersey	42
Tennessee	14
Granuloma, coccidioidal:	
California	4
Hookworm disease:	
Arkansas	8
Impetigo contagiosa:	
Tennessee	8
Jaundice, epidemic:	
California	4
Lead poisoning:	
Idaho	1
Massachusetts	1
Leprosy:	
California	2
Massachusetts	1
Mumps:	
Arkansas	13
California	974
Colorado	11
Delaware	23
Idaho	103
Iowa	32
Maine	264
Massachusetts	266
Missouri	45
Nebraska	24
New Jersey	353
Tennessee	79
West Virginia	3
Wyoming	35
Ophthalmia neonatorum:	
California	4
Massachusetts	101
Missouri	1
New Jersey	10
Tennessee	2
Paratyphoid fever:	
California	3
Massachusetts	5
New Jersey	1
Tennessee	3
Rabies in animals:	
Arkansas	25
California	145
Massachusetts	8
Missouri	6
New Jersey	8
West Virginia	8
Rocky Mountain spotted fever.	
Idaho	4
Septic sore throat:	
Arkansas	10
California	3
Idaho	2
Massachusetts	8
Missouri	44

November 1937—Continued	Cases
Septic sore throat—Contd.	
Nebraska	8
New Jersey	11
Tennessee	9
West Virginia	1
Wyoming	5
Tetanus:	
California	6
Tennessee	1
Trachoma:	
Arkansas	7
California	19
Idaho	1
Missouri	37
Tennessee	3
Trichinosis:	
California	4
Massachusetts	2
New Jersey	1
Tularaemia:	
Arkansas	3
California	1
Iowa	2
Missouri	7
Tennessee	2
West Virginia	2
Typhus fever:	
California	4
Tennessee	9
Undulant fever:	
Arkansas	3
California	17
Idaho	5
Iowa	18
Maine	2
Massachusetts	2
Missouri	1
New Jersey	2
Tennessee	1
Vincent's infection:	
Arkansas	1
Idaho	8
Maine	11
Tennessee	1
Whooping cough:	
Arkansas	95
California	1,002
Colorado	37
Delaware	15
District of Columbia	16
Idaho	51
Iowa	172
Maine	177
Massachusetts	471
Missouri	247
Nebraska	66
New Jersey	405
Tennessee	154
West Virginia	235
Wyoming	54

PLAGUE INFECTION IN FRESNO COUNTY, CALIF.

Under date of December 9, 1937, Dr. W. M. Dickie, Director of Public Health of California, reported that plague infection had been proved, by animal inoculation, in a lot of 5 *beecheyi* squirrels and in a lot of 6 golden-mantled squirrels collected on November 5 in the vicinity of Shaver Lake Post Office, Fresno County, Calif., and also in 63 fleas, in 3 lots, collected from 64 *beecheyi* squirrels received at the laboratory on November 5 from ranches 5 miles east and 1 and 2 miles south of Piedra, Fresno County, and from the Shaver Lake area.

WEEKLY REPORTS FROM CITIES

City reports for week ended Dec. 4, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	301	694	75	748	675	1,342	9	363	36	991	-------
Current week [1]	195	195	44	1,790	577	1,137	3	346	45	1,001	-------
Maine.											
Portland	0	------	0	0	2	0	0	1	0	11	23
New Hampshire:											
Concord	0	------	0	15	1	1	0	0	0	3	10
Manchester	0	------	0	0	1	3	0	0	0	0	10
Nashua	0	------	0	0	0	0	0	0	0	2	10
Vermont:											
Barre	0	------	0	48	0	0	0	0	0	0	2
Burlington	0	------	0	0	0	0	0	0	0	7	15
Rutland	0	------	0	1	0	0	0	0	0	9	6
Massachusetts:											
Boston	0	------	1	26	13	42	0	6	7	23	205
Fall River	0	------	0	0	2	2	0	1	0	33	16
Springfield	0	------	0	1	0	5	0	0	0	7	38
Worcester	0	------	0	0	3	2	0	0	2	14	46
Rhode Island											
Pawtucket	0	------	0	0	0	5	0	0	1	0	18
Providence	0	------	0	0	7	13	0	2	0	25	59
Connecticut:											
Bridgeport	3	------	0	0	3	12	0	0	0	0	26
Hartford	0	1	0	3	1	21	0	0	0	5	36
New Haven	0	1	0	0	1	5	0	0	1	1	32
New York:											
Buffalo	0	------	2	1	14	15	0	12	0	24	142
New York	26	21	4	33	95	116	0	72	10	148	1,471
Rochester	1	2	0	0	6	3	0	0	0	2	73
Syracuse	0	------	0	0	1	8	0	0	0	0	59
New Jersey:											
Camden	0	------	1	0	2	2	0	1	0	0	30
Newark	0	3	1	6	12	6	0	9	0	13	98
Trenton	0	------	0	71	4	4	0	2	0	7	44
Pennsylvania:											
Philadelphia	5	2	1	37	32	59	0	24	10	31	526
Pittsburgh	3	5	3	308	19	31	0	2	0	37	170
Reading	0	------	0	1	0	1	0	1	0	0	29
Scranton	0	------	------	17	------	3	0	------	0	0	------
Ohio:											
Cincinnati	7	------	2	0	8	27	0	14	0	10	156
Cleveland	2	4	0	65	13	45	0	11	0	46	192
Columbus	0	------	0	4	4	8	0	4	0	2	401
Toledo	0	------	0	9	8	3	0	0	0	6	80
Indiana:											
Anderson	0	------	0	0	0	11	0	0	0	5	15
Fort Wayne	8	------	1	0	2	0	0	4	0	0	33
Indianapolis	6	------	1	1	13	14	0	5	0	2	121
Muncie	1	------	0	6	1	2	2	0	0	0	6
South Bend	0	------	0	0	2	2	0	0	0	0	13
Terre Taute	1	------	0	1	0	0	0	0	0	0	12
Illinois:											
Alton	0	------	0	76	0	5	0	0	0	1	9
Chicago	16	16	2	129	39	152	0	29	1	29	740
Elgin	0	------	0	0	2	5	0	0	0	2	8
Springfield	0	2	1	0	3	2	0	0	0	3	22
Michigan:											
Detroit	18	1	0	79	30	86	0	16	0	41	271
Flint	3	------	0	2	3	22	1	0	0	4	36
Grand Rapids	0	------	0	5	3	33	0	0	0	4	34
Wisconsin:											
Kenosha	0	------	0	0	0	1	0	0	0	0	6
Madison	0	------	0	0	0	0	0	3	0	4	16
Milwaukee	1	------	0	65	8	16	0	4	0	26	18
Racine	0	------	0	1	1	3	0	0	0	9	9
Superior	0	------	0	0	0	0	0	0	0	0	4

[1] Figures for St. Paul estimated; report not received.

City reports for week ended Dec. 4, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Minnesota:											
Duluth	0		0	0	0	7	0	2	0	13	25
Minneapolis	1		0	2	4	33	0	0	0	9	94
St. Paul											
Iowa:											
Cedar Rapids	0			0		0	0		0	2	
Davenport	0			0		1	0		0	0	
Des Moines	0			2		34	0		0	0	33
Sioux City	0			0		3	1		0	3	
Waterloo	1			0		4	0		0	1	
Missouri											
Kansas City	1	1	0	5	6	16	0	4	2	0	99
St. Joseph	1		0	0	2	2	0	0	0	0	22
St. Louis	14		1	688	5	51	0	6	0	8	210
North Dakota											
Fargo	0		0	0	1	8	0	1	0	5	8
Grand Forks	0			0		9	1		0	1	
Minot	0			0		4	0		0	2	4
South Dakota:											
Aberdeen	0			0		7	0		0	2	
Sioux Falls	0		0	0	0	5	0	0	0	0	12
Nebraska:											
Lincoln	1			1		4	0		0	1	
Omaha	7		0	0	6	7	0	2	0	0	58
Kansas:											
Lawrence	0		0	0	0	1	0	0	0	3	11
Topeka	0		0	0	4	1	0	0	0	13	28
Wichita	0	1	1	0	3	5	0	0	0	14	32
Delaware:											
Wilmington	0		0	0	7	3	0	1	0	5	41
Maryland:											
Baltimore	17	2	1	3	16	39	0	15	0	65	232
Cumberland	0		0	1	2	1	0	0	0	1	9
Frederick	0		0	0	0	0	0	0	0	0	3
Dist. of Columbia:											
Washington	6	1	1	5	11	17	0	8	0	5	162
Virginia:											
Lynchburg	4		0	0	1	4	0	1	1	1	14
Norfolk	0		0	0	1	4	0	2	0	0	28
Richmond	1		0	0	3	9	0	1	0	0	48
Roanoke	1		1	0	0	0	0	1	0	4	6
West Virginia.											
Charleston	0		0	1	6	2	0	2	0	0	31
Huntington	1			7		2	0		0	0	
Wheeling	0	1	0	1	1	3	0	0	0	17	15
North Carolina:											
Gastonia	0			1		0	0		0	0	
Raleigh	0		0	0	2	3	0	0	0	16	11
Wilmington	1		0	0	2	0	0	0	0	15	14
Winston-Salem	0		0	2	0	3	0	0	0	13	11
South Carolina:											
Charleston	0	29	1	10	3	5	0	0	0	0	30
Florence	0		0	0	2	2	0	1	0	0	14
Greenville	0		0	0	1	0	0	0	0	4	2
Georgia:											
Atlanta	1	31	3	24	16	7	0	3	0	9	84
Brunswick	0		0	0	1	0	0	0	0	0	6
Savannah	0	42	3	0	3	1	0	2	0	0	30
Florida:											
Miami	0	1	0	32	3	2	0	2	2	0	33
Tampa	1		0	1	5	2	0	1	0	0	28
Kentucky:											
Covington	0		0	0	1	0	0	2	0	0	15
Lexington	0		0	3	3	0	0	2	0	7	22
Tennessee:											
Knoxville	8	2	1	0	1	8	0	0	0	0	23
Memphis	0		1	66	2	4	0	4	0	9	58
Nashville	4		1	0	3	4	0	2	0	7	51
Alabama:											
Birmingham	4	5	2	14	6	6	0	8	0	0	68
Mobile	0	1	0	0	2	1	0	0	0	0	25
Montgomery	0			0		1	0		0	21	
Arkansas:											
Fort Smith	1			0		3	0		0	0	
Little Rock	0		0	2	0	3	0	2	0	0	3
Louisiana:											
Lake Charles	0		0	0	0	0	0	0	0	2	3
New Orleans	8	3	1	0	20	8	0	4	1	28	155
Shreveport	0		0	0	6	2	0	5	2	0	56

City reports for week ended Dec. 4, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
Oklahoma:											
Muskogee	0			0		1	0		0	0	
Tulsa	2			1		5	0		0	13	
Texas.											
Dallas	5	1	1	0	4	5	0	2	0	0	56
Fort Worth	1		0	0	3	8	0	2	0	7	47
Galveston	3		0	0	8	2	0	0	0	0	23
Houston	8	3	0	2	7	7	0	3	1	6	71
San Antonio	1		1	1	11	1	0	10	1	0	75
Montana:											
Billings	0		0	1	0	0	0	0	0	0	8
Great Falls	0		0	1	0	2	1	0	0	13	7
Helena	0		0	2	0	0	0	0	0	6	
Missoula	0		0	0	1	0	0	0	0	0	11
Idaho:											
Boise	0		0	0	0	0	0	0	0	0	4
Colorado											
Colorado Springs	0		0	0	3	3	0	2	0	0	12
Denver	2		1	47	4	20	0	7	1	3	90
Pueblo	1		0	0	3	2	1	0	0	0	7
New Mexico:											
Albuquerque	1		0	18	2	0	0	1	0	0	11
Utah											
Salt Lake City	0		0	1	8	25	0	0	0	1	37
Washington:											
Seattle	0		0	0	4	5	0	4	0	14	104
Spokane	0		0	0	3	2	0	1	0	10	51
Tacoma	0		0	0	1	7	0	0	0	22	22
Oregon											
Portland	3		0	0	4	15	0	5	0	2	77
Salem	0	1		0		0	0		0	0	
California:											
Los Angeles	7	12	4	5	19	22	0	16	1	24	388
Sacramento	0		0	1	4	2	0	3	0	44	26
San Francisco	1	4	0	1	7	12	0	8	4	47	166

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
Massachusetts:			
Boston	1	1	0
Rhode Island:			
Providence	1	0	0
New York			
Buffalo	2	0	0
New York	5	2	1
Rochester	0	1	0
Syracuse	0	0	1
New Jersey:			
Trenton	0	1	0
Pennsylvania:			
Philadelphia	0	0	1
Pittsburgh	1	1	0
Ohio:			
Cleveland	1	0	0
Toledo	0	0	1
Illinois:			
Chicago	1	0	1
Wisconsin:			
Milwaukee	0	0	1
Minnesota:			
Minneapolis	0	0	1
Missouri:			
Kansas City	1	0	1
Maryland:			
Baltimore	3	0	0

State and city	Meningococcus meningitis Cases	Meningococcus meningitis Deaths	Poliomyelitis cases
District of Columbia:			
Washington	8	1	0
Virginia:			
Lynchburg	1	0	0
Richmond	1	0	0
South Carolina:			
Charleston	1	0	0
Alabama:			
Birmingham	0	0	1
Tennessee:			
Memphis	1	0	0
Louisiana:			
Shreveport	0	4	0
Texas.			
Dallas	1	0	0
Houston	0	0	1
Colorado:			
Denver	1	0	1
Washington:			
Seattle	1	0	0
Oregon			
Portland	1	0	1
California:			
Los Angeles	1	1	2

Dengue.—Cases: Charleston, S. C., 1.
Encephalitis, epidemic or lethargic.—Cases: New York, 2.
Pellagra.—Cases. Atlanta, 2; Savannah, 4; San Francisco, 1.
Typhus fever.—Cases: Charleston, S. C., 2; Tampa, 1; Montgomery, 2; Houston, 1

FOREIGN AND INSULAR

CANADA

Provinces—Communicable diseases—2 weeks ended November 20, 1937.—During the 2 weeks ended November 20, 1937, cases of certain communicable diseases were reported by the Department of Pensions and National Health of Canada as follows:

Disease	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskatchewan	Alberta	British Columbia	Total
Cerebrospinal meningitis				2	2					4
Chicken pox		25		211	367	161	72	26	149	1,011
Diphtheria		5	19	155	22	4	6			211
Dysentery				2	6					8
Erysipelas				5	3	4	4	4	2	22
Influenza		9		9	24		1		19	62
Lethargic encephalitis							1			1
Measles		9	10	185	250	5	48	28	260	795
Mumps		22			168	24	4	1	29	248
Paratyphoid fever					9			1		10
Pneumonia	3	1			28				26	58
Poliomyelitis			4	1	23	4	35	3	1	71
Scarlet fever	2	22	12	301	252	63	76	80	52	860
Tuberculosis	3	76	22	92	86	4	21	4	22	330
Typhoid fever		3	2	160	19	2	5		8	199
Undulant fever				1						1
Whooping cough		23		459	177	104	12	19	53	847

JAMAICA

Communicable diseases—4 weeks ended November 27, 1937.—During the 4 weeks ended November 27, 1937, cases of certain communicable diseases were reported in Kingston, Jamaica, and in the island outside of Kingston, as follows:

Disease	Kingston	Other localities	Disease	Kingston	Other localities
Cerebrospinal meningitis		1	Leprosy		2
Chicken pox	1	10	Puerperal fever		1
Diphtheria		5	Scarlet fever		4
Dysentery	8	2	Tuberculosis	30	69
Erysipelas		4	Typhoid fever	9	56

LATVIA

Notifiable diseases—July–September 1937.—During the months of July, August, and September 1937, cases of certain notifiable diseases were reported in Latvia as follows:

Disease	July	August	September
Anthrax			1
Botulism	5	1	3
Cerebrospinal meningitis	5	1	4
Diphtheria	38	68	77
Dysentery		5	1
Erysipelas	45	29	42
Influenza	40	49	57
Lead poisoning	2	1	
Leprosy			1
Lethargic encephalitis	1	1	2
Malaria	1		
Measles	1	3	4
Mumps	18	5	4
Paratyphoid fever	7	10	17
Poliomyelitis	3	8	11
Puerperal septicemia	7	11	11
Scarlet fever	244	189	263
Tetanus	2	3	5
Trachoma	30	41	56
Tuberculosis	277	264	310
Typhoid fever	64	64	102
Typhus fever			1
Whooping cough	277	219	147

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

NOTE.—A table giving current information of the world prevalence of quarantinable diseases appeared in the PUBLIC HEALTH REPORTS for November 26, 1937, pages 1738–1752. A similar cumulative table will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Cholera

China.—Cholera has been reported in China as follows: Week ended November 20, 1937, Swatow, 42 cases; week ended December 4, 1937, Shanghai, 6 cases.

French Indochina.—Cholera has been reported in French Indochina as follows: Hanoi, week ended November 20, 106 cases; week ended November 27, 77 cases. During the week ended December 4, Annam, 40 cases; Haiphong, 1 case; Hanoi, 21 cases; Tonkin Province, 274 cases.

Plague

Hawaii Territory.—Plague-infected rats have been reported in Hawaii Territory as follows: Island of Hawaii, Hamakua District, Hamakua Mill Sector, 1 rat, November 29; 1 rat, November 30; 2 rats, December 1; 2 rats, December 2; 1 rat, December 3. Island of Maui, Makawao District, 1 rat, December 3, 1937.

United States—California.—A report of plague infection in California appears on page 1900 of this issue of PUBLIC HEALTH REPORTS.

Smallpox

Great Britain—England and Wales—Chester County.—During the week ended November 20, 1937, 1 case of smallpox was reported in Chester County, England.

Mexico—Vera Cruz.—During the week ended December 4, 1937, 1 case of smallpox was reported in Vera Cruz, Mexico.

Typhus Fever

Great Britain—England and Wales—Gloucester County.—During the week ended November 20, 1937, 1 case of typhus fever was reported in Gloucester County, England.

Mexico—Chihuahua.—During the week ended November 27, 1937, 2 cases of typhus fever were reported in Chihuahua, Mexico.

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UNITED STATES TREASURY DEPARTMENT

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UNITED STATES PUBLIC HEALTH SERVICE

THOMAS PARRAN, *Surgeon General*

DIVISION OF SANITARY REPORTS AND STATISTICS

Asst. Surg. Gen. ROBERT OLESEN, *Chief of Division*

The PUBLIC HEALTH REPORTS, first published in 1878 under authority of an act of Congress of April 29 of that year, is issued weekly by the United States Public Health Service through the Division of Sanitary Reports and Statistics, pursuant to the following authority of law: United States Code, title 42, sections 7, 30, 93; title 44, section 220.

It contains (1) current information regarding the prevalence and geographic distribution of communicable diseases in the United States insofar as data are obtainable, and of cholera, plague, smallpox, typhus fever, yellow fever, and other important communicable diseases throughout the world; (2) articles relating to the cause, prevention, and control of disease; (3) other pertinent information regarding sanitation and the conservation of the public health.

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PUBLIC HEALTH REPORTS

VOL. 52 DECEMBER 31, 1937 NO. 53

MORTALITY FROM RHEUMATIC HEART DISEASE IN PHILADELPHIA DURING 1936 [1]

By O. F. HEDLEY, *Passed Assistant Surgeon, United States Public Health Service*

Rheumatic heart disease is the forgotten health problem. Despite the intense interest shown by clinical investigators and pathologists, health officers have been slow to recognize its importance. In this article an attempt is made to appraise rheumatic heart disease as a cause of death, to compare it with other public health problems, and to study the distribution of deaths from this cause during 1 year in a city of 2,000,000 population.

The chief difficulties in determining the death rate from rheumatic heart disease arise from the failure of physicians to report deaths as "rheumatic heart disease" and because the International List of Causes of Death does not contain rubrics for the tabulation of deaths from rheumatic heart disease when reported on the basis of etiology. It has been pointed out that this could be largely overcome by providing additional subtitles under titles 90–95 of the International List for recording deaths from this condition (*1*).

In December 1935 cards were sent to physicians, practicing in Philadelphia, requesting that they report deaths due to rheumatic heart disease as such. Notices were also sent to the hospitals. The coroner's office agreed to participate in the study. Cooperation of the Philadelphia County Medical Society was obtained and notices were inserted in the Weekly Roster, with suggestions concerning criteria for diagnosis. These efforts were superfluous in many cases as the local medical profession as a whole is alert to this problem. Most of the hospitals and out-patient clinics use the American Heart Association nomenclature, and a large number of physicians diagnose heart disease on the basis of etiology in their daily practice.

DEATH RATE

Three hundred and fifty-seven deaths were reported as due to rheumatic heart disease, subacute bacterial endocarditis superimposed on rheumatic heart disease, rheumatic fever, and chorea in 1936 (table 1). Of this number, 334 deaths, or 93.6 percent, were reported as rheumatic heart disease, and 18 deaths, or 5.0 percent, were reported as subacute bacterial endocarditis superimposed on rheumatic heart

[1] From the Office of Heart Disease Investigations, National Institute of Health. Branch office, 133 S. 36th St., Philadelphia, Pa.

27244°—37——1

disease. As most cases of subacute bacterial endocarditis occur as a complication of rheumatic heart disease, they were included in this series when so reported. Four deaths reported as rheumatic fever were included. Deaths in rheumatic fever from causes other than pancarditis are extremely uncommon as are also deaths from Sydenham's chorea, one of which was included in this series.

TABLE 1.—*Reported causes and mean ages at death in 357 deaths from rheumatic heart disease in Philadelphia during the year 1936*

Cause of death	Number	Per cent	Mean age (years)
Rheumatic heart disease	334	93.6	37.2
Subacute bacterial endocarditis superimposed on rheumatic heart disease	18	5.0	27.7
Rheumatic fever	4	1.1	14.0
Chorea (Sydenham's)	1	.3	8.0
	357	100.0	36.5

In addition to these 357 deaths attributed to rheumatic heart disease this condition was mentioned on 5 other death certificates as a secondary or contributory cause. These deaths were not included in any of the computations. Based on an estimated population of 2,028,511 the mortality rate was 17.6 per 100,000 population.

This is probably an underestimate of the total mortality as there were 195 other deaths not reported as rheumatic heart disease but regarded as presumably due to that cause (table 2). Sixty-eight of these were reported as subacute bacterial endocarditis, exclusive of cases superimposed on congenital cardiovascular defects or associated with septic conditions such as criminal abortions. Deaths from acute bacterial endocarditis, gonococcal endocarditis, and hemolytic streptococcal endocarditis were not included. White (*2*) states that 80 percent of cases of subacute bacterial endocarditis have a rheumatic background. Furthermore, rheumatic infection in childhood not infrequently runs a rapidly fulminating course terminating in subacute bacterial endocarditis, and is likely to be diagnosed as such at the time of death.

TABLE 2.—*Reported causes and mean ages at death in 195 deaths not reported as rheumatic heart disease but regarded as presumably due to that cause in Philadelphia during 1936*

Cause of death	Number	Per cent	Mean age (years)
Subacute bacterial endocarditis	68	34.9	35.7
Endocarditis—under 30 years of age	28	14.4	17.4
Endocarditis—over 30 years of age—of long duration	41	21.0	47.2
Mitral stenosis (alone or in combination with other lesions)	52	26.7	58.2
Adherent pericardium—of long duration	3	1.5	40.7
Aortic stenosis (2 cases under 50 years; 1 over 50 years, of long duration)	3	1.5	39.7
	195	100.0	41.8

There were 28 deaths of persons under 30 years of age reported as due to endocarditis or valvular lesions. At least 90 percent of heart disease among persons under 30 years of age is due to rheumatic heart disease, the remainder to congenital defects and other less frequent causes. Since deaths from congenital cardiovascular defects are computed separately, practically all of the fatal cases of heart disease occurring under 30 years of age are probably of the rheumatic type.

Forty-one deaths in persons over 30 years of age were reported as endocarditis or valvular disease of several years' duration. While the opportunities for error are greater with each succeeding decade of life, most of these deaths are attributable to rheumatic heart disease. For example, a death at 35 years of age from valvular disease of 17 years' duration is probably the result of rheumatic infection. All of these deaths followed illness of at least 3 years' duration.

Fifty-two deaths were listed as mitral stenosis, either alone or in combination with other valvular lesions. Rheumatic infection is by far the leading cause of mitral stenosis. There is reason however to question the validity of some of these diagnoses. The mean age was 58.2 years, much older than is usually encountered for rheumatic heart disease. Auricular fibrillation and gallop rhythms in coronary arteriosclerotic and hypertensive heart disease are sometimes mistaken for mitral stenosis. White states that mitral diastolic murmurs occasionally result from a relative stenosis due to cardiac dilatation (*2*). Osler (*3*) and Cabot (*4*) point out that mitral stenosis is not necessarily incompatible, especially in women, with a ripe old age. Most of these deaths past 60 years were among white females. Mitral stenosis not infrequently develops insidiously, or else older persons forget about rheumatic episodes in childhood. Furthermore, there were probably more undiagnosed than misdiagnosed deaths from mitral stenosis. Cabot states that not over 50 percent are recognized during life.

There were also three deaths from adherent pericardium and three from aortic stenosis—two in persons under 50 years of age and one over 50 years—all of long duration.

There are undoubtedly included among these 195 deaths presumably due to rheumatic heart disease a number of deaths from other causes. Contrariwise, there were probably many other deaths from rheumatic heart disease not included in this series. These include deaths certified as pericarditis, adherent pericardium, endocarditis of undetermined duration, aortic stenosis which may be due to rheumatic infection or calcareous changes, aortic insufficiency due to rheumatic infection, syphilis, arteriosclerosis or hypertension, and deaths certified as myocarditis in which the valvular lesion is overlooked. Often it is impossible to obtain any history, and physical examinations on very ill patients are likely to be unsatisfactory. A number of deaths not

included in the presumably rheumatic group were certified as "mitral insufficiency." Many were probably due to rheumatic heart disease, especially deaths occurring between 30 and 59 years of age.

When these two groups are combined, a total of 552 deaths is obtained. This represents a conservative estimate of the annual mortality from rheumatic heart disease in Philadelphia, a death rate of 27.2 per 100,000 population. This point is stressed because with

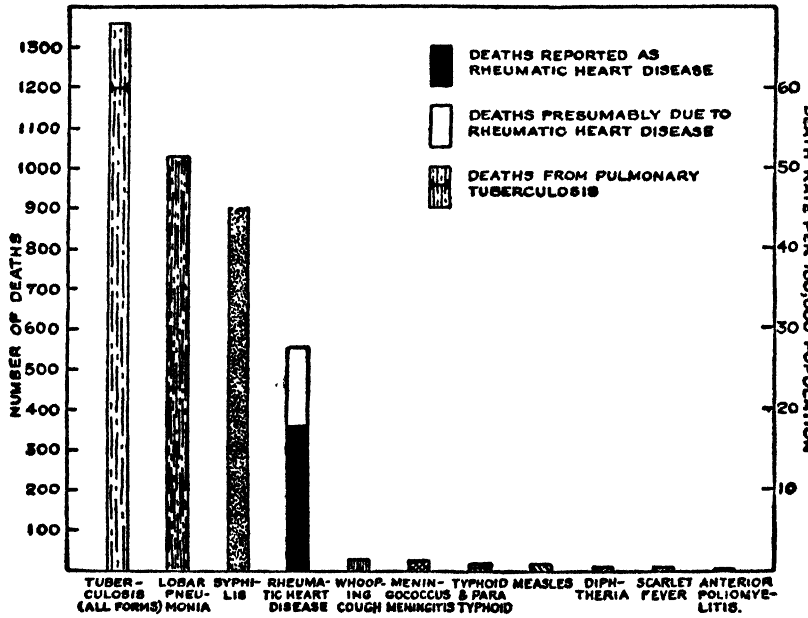

FIGURE 1.—Comparison of number of deaths at all ages and death rates per 100,000 population from rheumatic heart disease with other infectious diseases in Philadelphia during 1936.

better reporting the death rate will probably show an apparent increase. Several years will be required to stabilize the reported death rate.

IMPORTANCE OF RHEUMATIC HEART DISEASE AS A PUBLIC HEALTH PROBLEM

A comparison is made in figure 1 of deaths from rheumatic heart disease with deaths from other important infectious diseases in Philadelphia during 1936. Tuberculosis (all forms) leads with 1,349 deaths, a mortality rate of 66.4 per 100,000 population. Pulmonary tuberculosis accounted for 1,194 deaths, a mortality rate of 58.8 per 100,000 population. Pneumonia (excluding bronchopneumonia) followed with 1,085 deaths, or 53.4 per 100,000 population. Of these, 1,032 were due to lobar pneumonia.

The death rate from syphilis is unknown. During 1936, 305 deaths were reported as due to syphilis, a death rate of 15.0 per 100,000

population. This is probably far below the actual rate. The Division of Venereal Diseases of the United States Public Health Service estimates that the death rate in the United States from cardiovascular syphilis alone is 30.7 per 100,000 population (*5*). Since Philadelphia has about the same ratio of colored population as the entire United States, this estimate is roughly applicable to this city. There were also 100 deaths, or 4.9 per 100,000 population, due to locomotor ataxia and general paralysis of the insane. Aneurysms other than of the heart, most of which are due to syphilis, were reported as the cause of 215 deaths, a mortality rate of 10.6 per 100,000 population. In addition, there were many still-births and neonatal deaths attributable to syphilis. It is therefore believed that the mortality rate from syphilis is greater than that from rheumatic heart disease in this locality.

There were 30 deaths, 1.5 per 100,000 population, from whooping cough; 26 deaths, 1.3 per 100,000, from meningococcus meningitis; 18 deaths, 0.9 per 100,000, from typhoid and paratyphoid fevers; 15 deaths, 0.7 per 100,000 population, from measles; 10 deaths, 0.5 per 100,000 population, from diphtheria; 7 deaths, 0.4 per 100,000, from scarlet fever; and 2 deaths, 0.1 per 100,000 population, from anterior poliomyelitis.

Among all the infectious diseases, rheumatic heart disease ranks fourth as a cause of death in Philadelphia, exceeded only by pulmonary tuberculosis, lobar pneumonia, and syphilis. Among the essentially chronic infectious diseases, only tuberculosis and syphilis cause more deaths. In some of the New England cities rheumatic heart disease probably exceeds syphilis, while in the South syphilis is a much more important factor.

Excluding lobar- and broncho-pneumonia, which result in an extremely high reported mortality under 2 years of age, and the diarrheas and enteritis of infancy, the mortality from rheumatic heart disease in persons under 20 years of age was exceeded only by all forms of tuberculosis and was greater than that for pulmonary tuberculosis (fig. 2). During 1936 there were 138 deaths in this age period from all forms of tuberculosis, of which 86 were due to pulmonary tuberculosis. There were 94 deaths reported as due to rheumatic heart disease. In the group regarded as presumably due to rheumatic heart disease there were 28 deaths under 20 years of age. These totaled 122 deaths, which is believed to be a very close approximation of the actual mortality from rheumatic heart disease for this age period.

Whooping cough ranked third, with 30 deaths in persons under 20 years of age. Twenty-nine deaths were reported as due to syphilis. Doubtless there were many more deaths from syphilis during the first two decades of life than are shown in mortality tables. It is improbable that syphilis results in as many deaths in this age group as

rheumatic heart disease, especially if neonatal deaths from syphilis are excluded. Measles, resulting in 15 deaths under 20 years of age, meningococcus meningitis, with 12 deaths, diphtheria, with 10 deaths, scarlet fever, with 6 deaths, and anterior poliomyelitis, with 2 deaths, followed in the order listed. The year 1936 was a nonepidemic year for all of the acute communicable diseases, and these low figures do not always obtain. None of these conditions in recent years has exceeded the mortality from rheumatic heart disease during 1936.

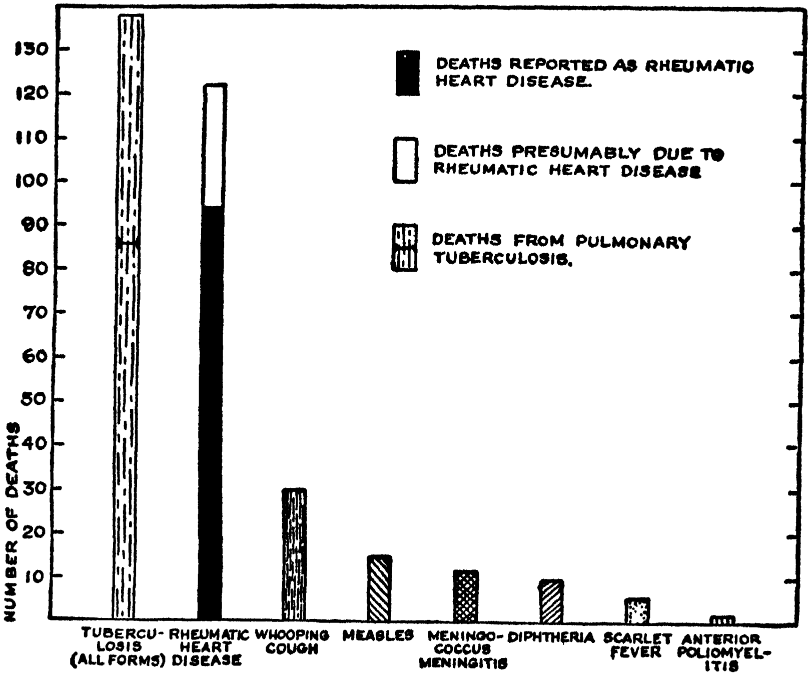

FIGURE 2.—Comparison of number of deaths in persons under 20 years of age from rheumatic heart disease with other leading infectious diseases during that period (excluding pneumonia and broncho-pneumonia, syphilis, and diarrhea and enteritis of infancy) in Philadelphia during 1936.

In figure 3 it is noted that rheumatic heart disease was responsible for more deaths in 1936 than the total for whooping cough, measles, meningococcus meningitis, diphtheria, scarlet fever, and anterior poliomyelitis. Doubtless this relationship does not exist in years when these diseases are very prevalent. Whether it holds over a number of years largely depends on the annual variations in the death rate from rheumatic heart disease. While the number of cases of rheumatic fever appears to vary from year to year, it is extremely doubtful whether the annual death rates fluctuate greatly, since the disease is essentially chronic and deaths usually occur after several years of illness.

DISTRIBUTION OF DEATHS BY AGE, SEX, AND COLOR

The mean age at death of the 357 deaths reported as due to rheumatic heart disease was 36.5 years. This is 3 to 8 years above the average among hospital patients. Coombs (*6*), in Great Britain, in a

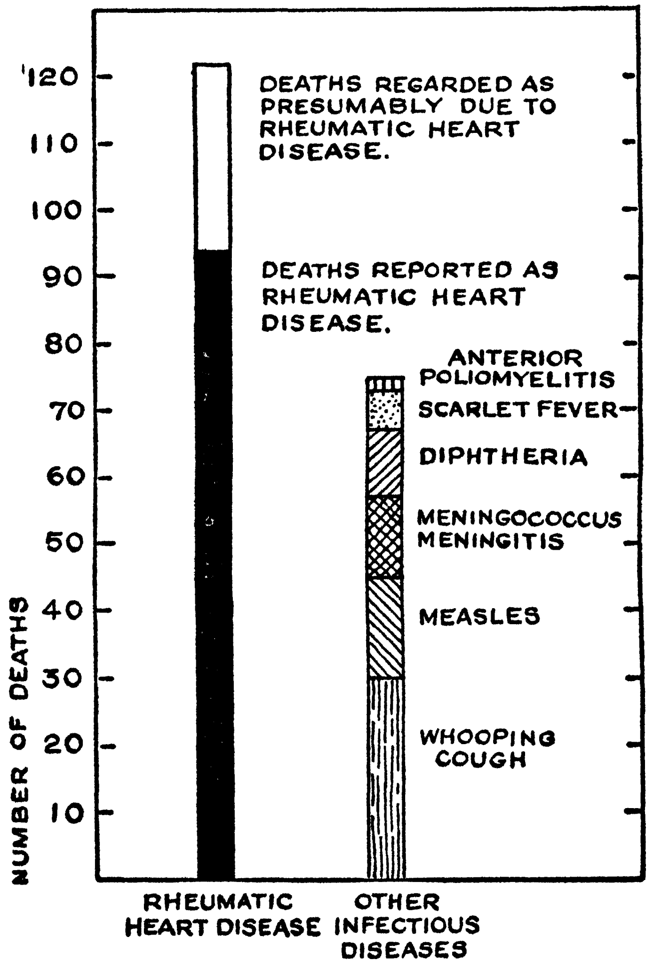

FIGURE 8.—Comparison of number of deaths in persons under 20 years of age from rheumatic heart disease with the total number of deaths during that period from other infectious diseases (excluding tuberculosis, pneumonia and broncho-pneumonia, syphilis, and diarrhea and enteritis of infancy) in Philadelphia during 1936.

series of 98 deaths from rheumatic heart disease examined post mortem found that the mean age at death was 28.3 years. The average age at death in Washington (D. C.) hospitals was 29.0 years (*7*). The mean age at death among hospital cases in Philadelphia during 1936 was 33.4 years, while among hospital cases in which death certificates were based on necropsy findings it was 33.0 years.

The higher mean age at death is in part due to the relatively large number of deaths reported as "rheumatic heart disease—mitral stenosis" among white females past 60 years of age. Mean ages at death based on hospital statistics are usually a few years younger than among the general population. Older persons balk at "going to the hospital to die." Their sickness is frequently of long duration and the expense of hospitalization is almost prohibitive, especially in view of the prognosis.

One hundred and sixty-nine deaths from rheumatic heart disease, or 47.3 percent, were among males and 188, or 52.7 percent, among females. In reviewing 4,653 admissions to Philadelphia hospitals from 1930 to 1935 for rheumatic fever, chorea, rheumatic heart disease, and subacute bacterial endocarditis, it was found that 58 percent were females. Most writers agree that there is a slight but appreciable predominance among females. White and Jones (*8*) noted that 54.9 percent of 956 clinical cases were females. Wilson, Croxford, and Lingg (*9*) reported that 60 percent of 500 juvenile cardiac patients were girls. Both Coombs (*6*) and Findlay (*10*) in Great Britain, observed a slight predominance among females. Mackie (*11*), in this country, however, noted an equal distribution. The higher incidence of rheumatic heart disease among females, although slight, is noteworthy. Most forms of heart disease, especially in middle life, occur more frequently in males.

A lessened incidence of deaths from rheumatic heart disease among males is not related to the ability of the cardiovascular system to withstand disease. The mean age at death among males was 35.4 years, while among females it was 37.2 years. The increased hazard on account of childbirth is not reflected in the mean ages at death among females. It is more than compensated by the increased vulnerability of the male cardiovascular system, to which may be added the factor of a greater output of energy in attempting to maintain his place in a competitive economic field.

Contrasted with the white population, Negroes succumb to rheumatic heart disease much earlier. The mean age among 61 colored deaths was 28.0 years, as compared with 38.1 years among 296 white persons. This lower age at death is observed in almost every form of cardiovascular disease. Here it may be attributed to greater racial susceptibility, ignorance of the significance of juvenile rheumatism, failure to apply to or cooperate with physicians, lack of proper medical facilities, especially in cases originating in smaller towns and rural areas, unfavorable economic conditions resulting in overcrowding, undernutrition, and a poor environment in general, and the not infrequent necessity for engaging in manual or domestic labor despite severe cardiac handicaps.

When each race-sex group is considered separately practically no difference is noted in the mean ages at death among white males and females, averaging 37.8 and 38.3 years, respectively. Among Negroes the difference is more evident, the average being 24.2 years for males and 31.6 years for females.

When the ages at death are subdivided into decades (table 3 and fig. 4) the percentage of deaths in each decade assumes a somewhat dromedary shaped curve with peaks in the 10–19-year age period and in the 40–59-year age group. Findlay noted a similar distribution of deaths from rheumatic heart disease in Great Britain.

Comparatively few deaths occur during the first attack of rheumatic fever. Atwater (*12*) estimated the case fatality rate at 1.7 percent,

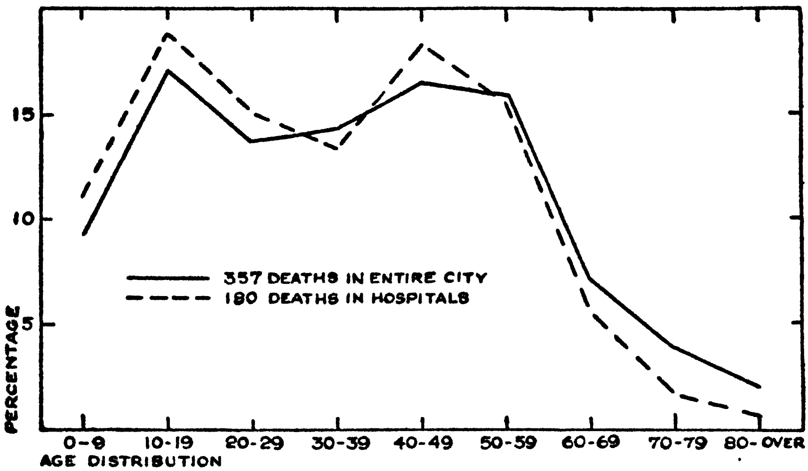

FIGURE 4.—Comparative percentage distribution in specific age groups between all deaths from rheumatic heart disease and deaths from rheumatic heart disease occurring in hospitals in Philadelphia during 1936.

and Swift at 1 to 4 percent (*13*). Ash (*14*) reports that in Philadelphia, 11 percent of deaths occurred within 2 years after the onset of rheumatic infection. Since the peak incidence of initial attacks is at about 7 to 10 years not many deaths occur before the second decade. Deaths during this period are usually due to cardiac insufficiency from repeated or continuous rheumatic infection.

A tendency about the age of puberty toward a subsidence of rheumatic infection is generally accepted, although contested by some authorities. Patients who have survived adolescence often do remarkably well until the late thirties or the 40–49-year age period. About this time there is a tendency for old smouldering infections to light up, resulting in cardiac insufficiency in the form of congestive failure. Other patients develop subacute bacterial endocarditis, due to the superimposing of *Streptococcus viridans* infection on probably slightly active rheumatic lesions. The onset of auricular fibrillation tells its

story—death in a few years at most. While the mechanical effects of distorted valves play an important role, it is becoming increasingly recognized that congestive failure at any age is usually initiated by reactivation of the rheumatic infection. Premature arteriosclerotic changes, accelerated by rheumatic infection, further weaken the heart. Coronary occlusion, however, is not a common complication. Despite this tendency toward a dromedary mortality curve, rheumatic heart disease maintains a steady attrition of its victims at all ages.

In figure 5 a comparison is made of the distribution by age decades of deaths among white persons and Negroes from rheumatic heart

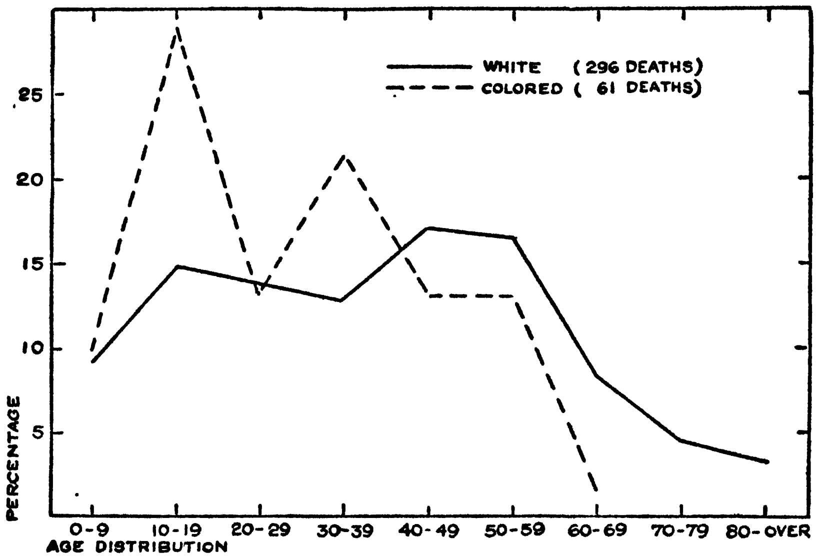

FIGURE 5.—Comparative percentage distribution in specific age groups between white and colored races of 357 deaths from rheumatic heart disease in Philadelphia during 1936.

disease. The mortality did not differ greatly during the first decade; apparently the proportion of deaths from fulminating pancarditis was quite similar. In the second decade, however, 27.9 percent of deaths among Negroes were caused by rheumatic heart disease, but only 14.9 percent of the deaths among white persons. This is indicative of a lower resistance to the infection among Negroes during this period. While it is dangerous to draw conclusions on the basis of a comparatively small series, attention is invited to the earlier secondary rise in mortality from this disease among Negroes. The secondary peak occurred precipitously in the 30–39-year age group among Negroes while among white deaths it is more gradual, reaching its maximum in the 40–49-year group. Comparatively few deaths were reported among Negroes past 50 years of age, while among white

persons, especially females, a considerable number of deaths occurred (table 3).

In figure 6 a comparison is made of the distribution of deaths by decades according to sex. Under 30 years of age there was practically no difference. The secondary peak occurred earlier among males. More females survive 60 years.

DEATH RATES ACCORDING TO COLOR AND SEX

As stated previously, the crude death rate of the 357 deaths reported as rheumatic heart disease was 17.6 per 100,000 population, based on the estimated population for the year 1936 of 2,028,511 persons.

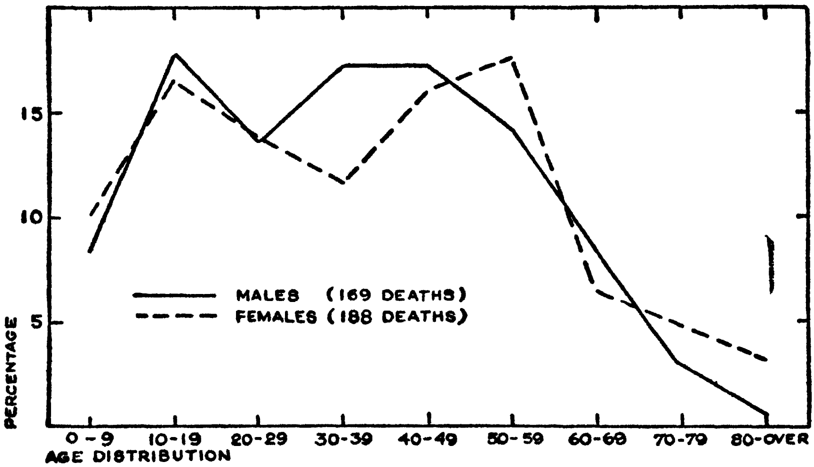

FIGURE 6.—Comparative percentage distribution in specific age groups between males and females of 357 deaths from rheumatic heart disease in Philadelphia during 1936.

Based on the 1930 census figures the death rate among white persons was 17.1, while among Negroes it was 27.8 per 100,000 population (table 3). Among males the death rate was 17.5, while among females it was 19.1 per 100,000 population. It was slightly higher among white females than white males, while the death rates among colored males and females were practically the same.

Rheumatic heart disease did not show the precipitous rise seen past 40 years of age for heart disease in general, which is due principally to deaths from hypertensive and coronary artery disease. The slight rise in age specific mortality is due to a smaller surviving population.

Under 60 years of age the mortality was consistently lower in the white than in the colored population. It was about 50 percent higher among Negroes during the first decade and nearly four times as high during the 10–19-year age group. Thereafter the increased age specific mortality was not so marked. Deaths from rheumatic heart disease are apparently more common among Negroes and occur at an

earlier age period. Dublin (*15*) observed that this held for heart disease during the younger age periods according to the experience of the Metropolitan Life Insurance Co., while Atwater (*12*) noted that it holds for deaths from rheumatic fever.

TABLE 3.—*Ages at death and age specific death rates by decades according to color and sex from rheumatic heart disease in Philadelphia during 1936 (based on 1930 census)*

Age group	Male			Female			Total		
	Population	Deaths	Rate per 100,000	Population	Deaths	Rate per 100,000	Population	Deaths	Rate per 100,000
	White								
0 to 9	141,331	10	7.1	137,780	17	12.3	279,111	27	9.7
10 to 19	152,879	20	13.1	154,265	24	15.6	307,144	44	14.3
20 to 29	150,417	19	12.6	155,922	22	14.1	306,339	41	13.4
30 to 39	144,099	23	16.0	141,224	15	10.6	285,323	38	13.3
40 to 49	116,808	25	21.4	112,855	26	23.0	229,663	51	22.2
50 to 59	82,046	23	28.0	85,270	26	30.5	167,316	49	29.3
60 to 69	49,327	13	26.4	54,119	12	22.2	103,446	25	24.2
70 to 79	18,878	5	26.5	23,551	9	38.2	42,429	14	33.0
80 and over	3,597	1	27.8	6,107	6	98.2	9,704	7	72.1
Total	859,382	139	16.2	871,093	157	18.0	1,730,475	296	17.1
	Colored								
0 to 9	18,875	4	21.2	19,083	2	10.5	37,958	6	15.8
10 to 19	14,493	10	69.0	16,941	7	41.3	31,434	17	54.1
20 to 29	23,115	4	17.3	27,138	4	14.7	50,253	8	15.9
30 to 39	24,316	6	24.7	23,419	7	29.9	47,735	13	27.2
40 to 49	16,117	4	24.8	14,007	4	28.5	30,124	8	26.6
50 to 59	8,039	1	12.4	6,608	7	105.9	14,647	8	51.6
60 to 69	2,526	1	39.6	2,573			5,099	1	19.6
70 to 79	733			921			1,654		
80 and over	162			299			461		
Total	108,376	30	27.7	110,989	31	27.9	219,365	61	27.8
	White and colored combined								
0 to 9	160,206	14	8.7	156,863	19	12.1	317,069	33	10.4
10 to 19	167,372	30	17.9	171,206	31	18.1	338,578	61	18.0
20 to 29	173,532	23	13.3	183,060	26	14.2	356,592	49	13.7
30 to 39	168,415	29	17.2	164,643	22	13.4	333,058	51	15.3
40 to 49	132,925	29	21.8	126,862	30	23.6	259,787	59	22.7
50 to 59	90,085	24	26.6	91,878	33	35.9	181,963	57	31.3
60 to 69	51,853	14	27.0	56,692	12	21.2	108,545	26	24.0
70 to 79	19,611	5	25.5	24,472	9	36.8	44,083	14	31.8
80 and over	3,795	1	27.8	6,406	6	93.7	10,165	7	68.9
Total	967,758	169	17.5	982,082	188	19.1	1,949,840	357	18.3

The impression that rheumatic heart disease is less common among Negroes is probably due to a failure to weight statistics on the basis of proportionate populations.

DEATHS FROM RHEUMATIC HEART DISEASE IN HOSPITALS

Of the 357 deaths, 180, or 50.4 percent, were among regular admissions, excluding coroner's cases, to hospitals approved for interne-

ship by the American Medical Association. This proportion would probably be reduced to a certain extent by more complete reporting of outside cases.

The mean age at death among 65 white males in hospitals was 34.5 years; while among 76 white females it was 36.1 years. Among 141 white patients the mean age at death was 35.4 years. Nineteen colored males and 20 colored females died in hospitals, at a mean age of 22.0 and 30.7 years, respectively. The mean age at death of colored patients was 26.2 years. The mean age at death of all hospital patients was 33.4 years. Deaths in hospitals occurred, in each group, a few years earlier than in the city as a whole.

In figure 4 a comparison is made of the percentage distribution by age decades of deaths from rheumatic heart disease in the city as a whole with deaths in hospitals. The curves are quite similar, and it is believed that the accuracy of deaths reported as rheumatic heart disease compares favorably with other certified causes of death. Both are dromedary shaped with peaks in the 10–19-year age period and in the 40–49-year age group. The chief difference is the larger number of deaths past 60 years from the city at large than in hospitals.

Seventy-four death certificates were based on necropsy findings. The mean age was 33.0 years, not dissimilar to that in the hospital series. Although these diagnoses are more accurate, they represent a highly selected group. Many racial, economic, and social factors are related to the obtaining of permission for necropsy.

MISCELLANEOUS DATA

Percentage of total mortality due to rheumatic heart disease.—During 1936, deaths reported as rheumatic heart disease constituted 1.4 percent of all deaths in Philadelphia. With more uniform reporting it would probably account for 2.5 percent of the total mortality. In the 0–9-year period it accounted for 1.7 percent of deaths, in the 10–19-year period for 11.5 percent, in the 20–29-year age group for 4.6 percent, in the 30–39-year age group for 3.0 percent, in the 40–49-year age group for 2.1 percent, in the 50–59-year group for 1.4 percent, in the 60–69-year period for 0.5 percent, in the 70–79-year age group for 0.3 percent, and at 80 years and over, for 0.3 percent. A higher proportion of the total deaths occurred during youth and comparatively early adult life. Unlike most forms of heart disease it results in a smaller percentage of the total number of deaths in each successive decade.

Racial stocks.—An attempt was made to compare deaths from rheumatic heart disease with deaths picked at random during similar age decades for controls. Deaths from rheumatic heart disease did not appear unduly frequent in any racial stock.

Coroner's cases.—Fifty-seven deaths, or 16.0 percent of the mortality from rheumatic heart disease, were reported by the coroner's office.

Nonresident deaths.—Only 29 deaths, or less than 8 percent, occurred among nonresidents.

Influence of pregnancy.—In only five deaths, all among white persons, was pregnancy mentioned as a contributory factor.

Distribution by city wards.—Although no definite conclusions can be drawn, it did not appear that deaths occurred with significantly greater frequency in any part of the city.

Monthly variation.—The greatest number of deaths occurred in February, the smallest in September. The monthly distribution is similar to that for the general mortality, especially for heart disease.

COMMENT

The interest of the public in almost any disease is usually proportional to the excitement it causes and not necessarily dependent on its consequences either to the individual or the community. To the lay mind, the explosiveness of an outbreak has a dramatic appeal. Some diseases are better publicized than others. A suspected case of leprosy causes more excitement if not panic than a hundred deaths from malaria, pellagra, syphilis, pulmonary tuberculosis, or rheumatic heart disease. While there is little danger of leprosy becoming a major health problem in the United States, year in and year out these other diseases relentlessly take their toll.

If as many cases of anterior poliomyelitis developed in a city in the northern part of the United States as are normally found in the hospitals alone due to rheumatic heart disease in children, it would result in scare headlines and serious attempts to close down the schools. Yet the problem of rheumatic heart disease is at least equally serious. The person who contracts anterior poliomyelitis is often much more fortunate. He is at least immune to other attacks and can anticipate varying degrees of return of function. In rheumatic heart disease reactivation and recrudescences are more nearly the rule than the exception.

Rheumatic heart disease is one of mankind's most undramatic afflictions. Hardly any ailment is regarded with less concern by the laity than rheumatism. In the stress and strain of family and business life, the average adult pays little attention to joint and muscle pains until they become incapacitating. Consequently rheumatism in childhood is too often regarded with apathy. Its relatively slow progression often causes people to lose sight of its downward course. Compared to the pace set by most diseases of childhood it plays the successful, though more ominous, role of the tortoise in the fable of the tortoise and the hare. It is difficult for parents, school authorities, and others to visualize rheumatic infection in childhood as a systemic disease in which the heart bears the brunt of the attack.

As a public health problem is has not received the attention it deserves. While in the present study there were doubtless imperfections in reporting deaths, and improvements could be made in the method of presenting these statistics, the results leave no doubt that rheumatic heart disease ranks as one of our major health problems from the standpoints of total mortality and age at death. Rheumatic heart disease not only results in loss of manpower to the Nation from deaths in childhood, adolescence, and the most economically productive period of adult life, but it lessens its manpower per man by causing various degrees of physical incapacity in about 1 percent of the wage earning population.

The International List of Causes of Death should be changed to permit the tabulation of deaths from rheumatic heart disease as an entity. Additional subtitles should be added under "Heart disease" for "Rheumatic heart disease." Physicians should be encouraged to report deaths from this cause on the basis of etiology. As demonstrated in Philadelphia, this need not prove difficult. Clinicians are aware of the problem, especially in the Northern States. By adding deaths reported as rheumatic heart disease to those reported as rheumatic fever, the mortality can be determined. This plan has received the approval of the Bureau of the Census (*16*), which unofficially put it into effect in the United States in 1937,[2] and of the committee on accuracy of certified causes of death, of the American Public Health Association.[3]

Better vital statistics are essential as a means and not as an end. They serve as an index for evaluating the effects of a disease and for studying its trends. Statistics, however accurate, will not solve the problem. Too much clinical and public health research begins at the morgue or with the registrar of vital statistics and gets no further. Concerted action among hospitals and clinics, bacteriological and pathological laboratories, epidemiological investigations of the house-to-house variety, sickness and industrial surveys, better health examinations of school children, and like measures are needed.

CONCLUSIONS

1. In response to a request to the practicing physicians, coroner's office, and hospitals, 357 deaths were reported from rheumatic heart disease, rheumatic fever, chorea, and subacute bacterial endocarditis in Philadelphia during 1936. The mortality rate from rheumatic heart disease reported during this year was 17.6 per 100,000 popuation.

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[2] Personal communication from Dr. Halbert C. Dunn.

[3] Personal communication from Dr. Haven Emerson.

2. In addition, 195 deaths regarded as presumably due to rheumatic heart disease were reported. The total mortality from rheumatic heart disease during 1936 is estimated at 25 to 30 per 100,000 population.

3. Among the infectious diseases, rheumatic heart disease was exceeded as a cause of death by tuberculosis, lobar pneumonia, and syphilis. Among the essentially chronic infectious diseases it ranked third, exceeded only by tuberculosis and syphilis. It is believed that this is the usual relationship in this locality.

4. Rheumatic heart disease resulted in considerably more deaths than whooping cough, meningococcus meningitis, typhoid and paratyphoid fevers, measles, diphtheria, scarlet fever, and anterior poliomyelitis, which followed it in the order listed.

5. In persons under 20 years of age rheumatic heart disease was the cause of more deaths than pulmonary tuberculosis, but fewer deaths than all forms of tuberculosis. Excluding pneumonia and bronchopneumonia and the diarrheas and enteritis of infancy, it was the second largest cause of death from infectious diseases.

6. In the year under study, rheumatic heart disease resulted in more deaths under 20 years of age than whooping cough, measles, meningococcus meningitis, diphtheria, scarlet fever, and anterior poliomyelitis combined. These diseases followed rheumatic heart disease in the order mentioned. While rheumatic heart disease probably does not result in more deaths than all of these diseases during years in which epidemics of one or more of them occur, there is little doubt that over a course of years it is the cause of more deaths than any one of them.

7. The mean age at death was 36.5 years. Among all deaths from rheumatic heart disease occurring in hospitals approved for interneship by the American Medical Association the mean age was 33.4 years. Among necropsy cases it was 33.0 years.

8. Both in the number of deaths and the death rate per 100,000 population, females slightly exceeded the males. Among the males, especially Negroes, the mean age at death was somewhat younger.

9. The mortality was appreciably higher among Negroes than white persons, particularly under 40 years of age. It was especially high in Negro males in the 10–19-year age period.

10. A plea is made for increased recognition of the importance of rheumatic heart disease by health officials, for improved reporting and recording of deaths from this cause, and for greater cooperation among various agencies which may contribute to its study.

ACKNOWLEDGMENTS

The writer is especially indebted to Dr. Frank P. Strome, director of the bureau of vital statistics of the Pennsylvania State Department

of Health, for permission to abstract the death certificates which form the basis of this paper. Statistics concerning the incidence of diseases other than rheumatic heart disease were obtained from the Annual Report of the Health Department of Philadelphia. The writer is also indebted to Dr. C. C. Wolferth, of the Robinette Foundation of the University of Pennsylvania, for a number of helpful suggestions in the preparation of this paper.

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THE FAMILY AS A UNIT FOR NURSING SERVICE [1]

By Helen Bean, *Associate Public Health Nursing Analyst*, and Georgie S. Brockett, *United States Public Health Service*

Perhaps one of the chief advantages of home visiting in a public health nursing program is the opportunity presented for ascertaining the health needs of various members of the family and for assisting in the solution of special problems. The nurse observes the social and

[1] From the Division of Public Health Methods, National Institute of Health, in cooperation with Division of Domestic Quarantine. Special recognition is due to Dr. Mayhew Derryberry for his advice and guidance in the preparation of this paper.

environmental conditions in the home, and with this first-hand information she can adapt her advice so that it is directly applicable to the limitations within the family. Then, too, there is the situation demanding immediate attention which has not been recognized by the family. Many of these needs can be uncovered only by a personal visit to the household. Therefore, when a nurse goes into a home it is expected that she will not only give the nursing care or health instruction which occasioned her visit, but that she will also obtain an estimate of the health needs of the entire family and work out a constructive health plan for its several members.

The advantages of the home visit as a method of rendering a complete family health service have been repeatedly stressed by nurses and other public health workers (*1*, *2*, *3*, *4*). In view of the emphasis that has been placed on the principle of "the family as the unit" for nursing service, it seemed appropriate to investigate the degree to which nurses in actual practice broaden the scope of their visits to include members of the family other than the specific individual whose condition initiated the home call. If many of their visits are confined to service for a single individual, then the alleged values of home visiting in terms of constructive health service to the entire family are not attained. Therefore, the extent to which other members of the household are served becomes one measure for determining the achievements of field nursing service.

THE DATA

During the study of county health department practice, the United States Public Health Service obtained, among other data, duplicate records of all the work of the personnel in three rural health departments covering a period of 1 year. It has been possible to utilize the records of field nursing as a means of ascertaining the amount of family health service in the three counties. The conclusions are, therefore, limited by the recording policies of the department and the faithfulness with which all the services to a family were entered on the record.

The procedure for recording home visits followed commonly accepted practice. Each nurse made a daily report of all services rendered. An individual case record and a family folder showing the roster of the household members were opened whenever the nurse found a condition suggesting the necessity for a permanent record or the desirability of further nursing attention (*5*). Since no evidence pertaining to the composition of the family was available for households where visits were recorded on the daily report only, the analysis has been limited to families for whom the nurse opened a family folder. The volume of nursing service excluded from the analysis by limiting the material in this manner may be judged from the data in table 1.

In approximately one-third of the families given home care the problems found were considered of such slight importance that no family record was opened. It would seem safe to assume that in these families little or no service was rendered to members of the household other than to the specific individual whose name the nurse entered on her daily report. It is likely, therefore, that, by excluding the 1,498 families without folders, and limiting the analysis to the 3,074 with folders, the data are weighted in favor of a more complete family service than would be given on an initial visit or on an average of all visits to a family.

TABLE 1.—*Distribution of families served in the home and number of these for whom family folders were not opened by the nurses*

County	Families served in the home		
	Total families	Families for whom no folders were opened	
		Number	Percent
A	552	266	48.2
B	1,476	[1] 575	39 0
C	2,544	657	25 8
Total	4,572	1,498	32.8

[1] 16 families having home visits in county B for whom folders were opened were included in this group because the information thereon was inadequate for this study

In making this analysis, it is recognized that information concerning the health needs of all members of the household is limited by the entries nurses made on the records. However it is doubtful that any constructive health plan was contemplated for the family if no record was made of it, for without a record the plan would not be likely to function. Therefore, the frequency with which nurses described problems in the home, other than the one that initiated the visit, may be considered indicative of the degree to which they gave attention to the "family as a unit."

There were a number of other factors which may have limited the amount of service the nurses rendered each family. In the first place, the population load per nurse was much higher than is ordinarily recommended for an adequate nursing service. In county A each nurse was required to serve a population of over 13,000 individuals, while in counties B and C the load was about 10,000 and 7,000, respectively. Furthermore, many of the families were large, oftentimes including a total of 12 and sometimes as many as 18 individuals. A third factor to be considered was the distance to be traveled. Approximately one-fourth of the population lived in the open country, while the remaining three-fourths resided in small villages scattered throughout the county. As the same limitations affect the field

nursing service of most county health departments, the results obtained from an analysis of the records of these three organizations are more than likely indicative of the nursing service in many other counties where conditions are similar.

PROPORTION OF THE FAMILY SERVED AT THE TIME OF NURSING VISITS

There were only 11 of the total of 3,074 families studied in which all members were served at every visit; and 3 of these consisted of but 1 member each. The remaining eight families were visited because of either tuberculosis or other communicable disease. In such situations all exposed individuals are contacts, and it is essential that nurses consider the possibilities of disease in the whole family. Even though all members were served in these homes, it is unlikely that a constructive health plan for the entire family was worked out, since a return nursing visit was made to only one of the eight households.

It may be argued, however, that there were few households in which every member had a health problem which required the assistance of a nurse. Accordingly, the 3,063 families in which not all members were served at each visit were divided into two groups—those in which only one individual was served on each visit, and those in which more than one person was served during one or more of the total visits to the family. The number of families in each of the classifications is shown by county in table 2. In over one-third of the households only one individual was served by the nurse on every visit to the home. The proportions varied from 31 percent in county B to 45 percent in county C.

TABLE 2.—*Distribution of families according to the number of individuals served during home visits*

Classification of families	Number of families served			Percentage of families served		
	County A	County B	County C	County A	County B	County C
All families	286	901	1,887	100.0	100.0	100.0
All members served on every visit to the families	5	6		1.7	.7	
More than 1 member served on 1 or more of the total visits to the families [1]	152	617	1,223	53.2	68.5	64.8
Only 1 member served on every visit to the families	129	278	664	45.1	30.8	35.2

[1] Does not include families with all members served on every visit.

One might expect more health problems in larger families, hence the smaller families should predominate in the group in which only a single member was served. That this tendency existed to a slight degree is suggested by the data in table 3. The average size for the families with one individual served was somewhat smaller than the

average size for all families receiving nursing care. However, in each county the difference is less than one individual per family. Moreover, in more than a fifth of the larger families—those with eight or more members—only one person was given service.

TABLE 3.—*Comparison of the average size of all families served with that of the families having a single member served*

County	Average size of families	
	All families served	Families having only one member served
A	6.4	5.7
B	6.5	5.7
C	6.0	5.1

In order to summarize the extent to which the nurses approximated a total family service for those households in which more than one individual was seen, the number of individuals served in the home was expressed as a percentage of the total number in the family. For example, if there were six individuals in a family and the nurse served two of them, then 33 percent of the family was reached. If she made two visits, serving two individuals at the first home call and one on the second, the average percentage served in a family of six would be 25.[2]

The median percentage of the family served during each visit was 29 in county A, 33 in county B, and 32 in county C. Thus it is evident that less than a third of the household members were served in the course of visits to over one-half of the families. Furthermore, in only 2 percent of the families were as many as three-fourths of the household members served during a nurse's visit.

The small number of families in which every member was given attention, the relatively large group in which a single individual was served at each visit, and the low percentages of the family served, even when more than one member was included, indicate definitely that little consideration was given to the needs of all the family when the nurse entered the home.

SERVICES TO THE FAMILY UNDER SPECIFIC CONDITIONS

In making the above analysis, consideration was given to the proportion of the family served irrespective of the specific condition which stimulated the call or of the needs for care which the nurse may have encountered. Of course, the nurse should render service or give advice only when there is a need for such assistance. There are,

[2] To arrive at a percentage for each family, the number of individuals served on each visit was added and used as the numerator and the number of individuals in the family was multiplied by the number of visits and used as the denominator.

however, some situations in which the need for service to more than one individual in the family can be predicated from the condition which caused the visit. In order to measure the extent to which the nurses actually met the needs of these families, an analysis of service in the households presenting such problems has been made.

When there is tuberculosis in a family, a nurse makes a visit presumably to advise the patient in regard to his own care and to urge examination of all contacts. Hence, if nurses were guided by these purposes when they visited homes in which tuberculosis was a problem, the proportion of the household given service would approach 100 percent. Actually among families with a case of tuberculosis the average proportion of the members served on a visit was 29 percent in county B and 27 percent in counties A and C. Furthermore, in over one-third of the households where tuberculosis was a problem, only one individual was given attention. According to these data the nurses failed to consider the family as a unit when they made visits for tuberculosis, thus neglecting an important procedure for preventing the spread of the disease.

Infant health supervision is another service which nurses are expected to give whenever an infant is found in the home, regardless of the original purpose of the visit. However, it was found that the infant was not served in 21 percent of the families where there was the possibility of such supervision. Also, in the families where there were preschool children, no service was given them in 28 percent of the situations. The proportions for the separate counties appear in table 4. Despite the fact that nurses conducting a generalized program are expected to give special attention to infants and preschool children when they make a visit, these nurses failed to take advantage of this opportunity to render a preventive health service.[3]

TABLE 4.—*Number of households visited by the nurse in which there were infants or preschool children, and percentage of these groups receiving no service*

County	Households visited by the nurse			
	Number containing infants	Percentage in which infants were not served	Number containing preschool children	Percentage in which preschool children were not served
All counties	1,106	21.1	2,054	28.2
A	89	24.8	165	62.4
B	481	21.2	660	33.3
C	536	18.7	1,229	20.9

[3] Since the preparation of this paper, Randall has reported the following: "An analysis of the (New York City) Health Department nurses' home visits to this sample of families revealed that in 31 percent of household visits to families in which there was an infant, no infant service was recorded; that 45 percent of the visits to families with preschool children gave no record that the preschool child had been visited" (7).

PROPORTION OF FAMILY SERVED DURING STUDY YEAR

The extent to which nurses perform a family service may be considered from a somewhat different point of view. Conditions may be such during a given visit that it is better to limit service to one individual and to consider other members of the family at a later visit. In such instances the percentage of the individuals in the families served over an extended period of time might be greater than the percentage served on any one visit. The possibilities of such consideration by the nurses are somewhat limited by the fact that 30 percent of the families were visited only once during the study year.

Furthermore, the data presented thus far have been confined to services in the home. If a nurse renders additional service to certain members of a family in her office or in the school, she may not need to continue service for them in the home. Hence the proportion of the family served might be increased if the services rendered at other places than the home were included. In order to investigate the extent to which the nurses rendered service to all members of the family regardless of place or time, the total number of individuals served during the study year was expressed as a proportion of the aggregate number of individuals in all the households visited by the nurse. The resulting proportions are 43.7 percent for county A, 43.2 percent for county B, and 51.2 percent for county C. Thus, less than half of the individuals in the families visited by the nurses were given a direct service or were advised concerning a health problem.

FACTORS ASSOCIATED WITH MULTIPLE SERVICES TO THE HOUSEHOLD[4]

In the preceding tables it has been shown that the nurses did not give a complete family service at the time of their visits, but that they did serve more than one individual in about two-thirds of the families included in their clientele.

According to table 5 there was a tendency to give multiple services to the white families more frequently than to the Negro families. This trend was most pronounced in county A.

TABLE 5.—*Percentage distribution of white and colored families according to number of individuals served on a home visit*

Number of individuals served in family	County					
	A		B		C	
	White	Negro	White	Negro	White	Negro
1 individual served	43.5	59.5	28.4	33.6	34.9	38.7
More than 1 individual served	56.5	40.5	71.6	66.4	65.1	61 3

[4] The term "multiple services" is used in this paper to mean that more than 1 individual in a family was served during a single visit.

Previous studies (*6*) have shown that economic status is associated with the selection of families for home visiting. It is also related to the rendering of services to a family when a nurse visited the home. Among those families considered in the comfortable economic status group for all three counties, a single individual was served in 48 percent of the households, whereas this percentage was only 31 among the families of low economic status. The percentages for each county appear in table 6.

TABLE 6.—*Percentage distribution of families in different economic groups according to number of individuals served per home visit*

Economic status	Percentage of families with one or more served					
	County A		County B		County C	
	1 individual served	2 or more individuals served	1 individual served	2 or more individuals served	1 individual served	2 or more individuals served
Comfortable	63.6	36.4	33.3	66.7	51.3	48.7
Moderately comfortable	59.3	40.7	36.4	63.6	39.2	60.8
Poor and very poor	40.3	59.7	28.9	71.1	29.6	70.4

The nurse may have given more service to the lower economic group because she recognized the greater need for service in homes where overcrowded conditions, inadequate clothing, and lack of proper food made the entire family more susceptible to disease, or again there may have been disease conditions already present in several members of the household.

SUMMARY

Records of the services rendered by public health nurses in three rural counties have been analyzed to ascertain the extent to which the cardinal principle of "the family as the unit" was observed in spreading service within families selected for home visits. The conclusions are necessarily qualified in terms of the faithfulness of the nurses in recording all the services.

The nurses whose records were analyzed were working under conditions commonly encountered in rural situations. Each nurse was required to serve a large population, most of which was distributed throughout the county. Thus it was necessary to travel considerable distances in order to reach the families.

Little or no evidence could be found that the nurses were rendering a complete family service. In one-third of the families only one person was served at any visit to the homes. Even when more than one person was served, relatively few of the family were included. The proportion of the family given care and advice was not increased when the visit was made for the purpose of tuberculosis control;

neither was consideration given to the health needs of a very high percentage of the infants in the homes visited by the nurses. Even when all services rendered to a family during the period of a year were included, less than a half of the individuals were given attention. Evidently, from the data assembled, the nurses did not render a diversified service when they made a home call. Their visits seemed to be confined to services for one or two members in the family, with very little attention given to the development of constructive programs for the family as a social unit. Such limitations in the spread of nursing service considerably decrease the possible value of home visiting. It is hoped, therefore, that this analysis may stimulate health departments to appraise their nursing activities and to ascertain to what degree, in actual practice, stated objectives are really being attained.

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DIBENZANTHRACENE TUMORS IN MICE

The Production of Subcutaneous and Pulmonary Tumors by 1: 2: 5: 6-Dibenzanthracene Adsorbed on Charcoal

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The appearance of lung and liver tumors in mice (*1*) injected subcutaneously with 1:2:5:6-dibenzanthracene is evidence that the compound is capable of producing tumors in tissues which are distant from the site of injection. The problem arises as to whether the carcinogenic agent produces in the injected animal a constitutional change of which pulmonary and liver tumors are a local manifestation, or whether the tumors are the result of a direct action of the compound, or a derivative, upon the tissues of those organs. The results of one experiment performed to elucidate this problem have been reported (*2*). Pulmonary tumors were induced in mice by inserting into their

lungs threads coated with the hydrocarbon. In the present communication are included the findings of other experiments in which the carcinogenic agent was brought into contact with the lung tissues of mice. In order to place the compound in the lungs without inciting the irritation which accompanied the thread experiments, it was decided to adsorb it onto a substance which, when injected intravenously, is known to localize in the lungs.

During the course of previous investigations (*9*) in this laboratory in which efforts were made to detect the presence of 1: 2: 5: 6-dibenzanthracene in mouse tumors produced subcutaneously by the compound, it was found [1] that charcoal had a tendency to adsorb the hydrocarbon. This report deals with experiments in which 1: 2: 5: 6-dibenzanthracene adsorbed on charcoal was injected into mice both subcutaneously and intravenously.

PREPARATION OF 1: 2: 5: 6-DIBENZANTHRACENE ADSORBED ON CHARCOAL

Different kinds of powdered charcoal were tested for impurities of tarry nature by shaking them with ether [2] and comparing the ultraviolet absorption spectra. With the exception of medicinal charcoal, the filtered ether showed strong continuous absorption, beginning at approximately $\lambda=3000$ A, indicating the presence of impurities, probably of a tarry nature. This charcoal was used in the experiments.

To remove larger particles, the charcoal was shaken with ether in a separatory funnel, and the larger particles, after settling, were drained off. After drying at about 40° C. and heating in a porcelain dish at approximately 300° C., the charcoal was activated by heating it under vacuum (as produced by a Cenco Hyvac pump) to a temperature of 270° C. for 8 hours. Much difficulty was encountered when the gas escaping from the particles caused them to fly all over the vacuum system. This was avoided by inserting a cone of platinum sheet in the glass tube containing the charcoal.

Five hundred mg of charcoal thus activated were added to a solution of 400 mg of purified 1: 2: 5: 6-dibenzanthracene in 500 cc of ether, and this mixture was shaken for 8 hours at room temperature. The adsorption process is, however, almost complete after shaking for 10 minutes. Then the mixture was filtered and the charcoal washed with ether. Quantitative spectrographic analysis (*9*) of the 1: 2: 5: 6-dibenzanthracene content of the filtrate, as well as weighing the charcoal after drying, gave 0.5 mg of the hydrocarbon adsorbed on 1 mg of charcoal.

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[1] Experiments performed in collaboration with Dr. M. J. Shear.

[2] The purity of the ether used was tested by evaporating 100 cc of ether to 1 cc and comparing its ultraviolet transmission with that of the original ether. Except for the short ultraviolet ($\lambda<2300$ A) no difference in transmission was observed.

No attempt was made to determine the saturation content, since 0.5 mg of 1: 2: 5: 6-dibenzanthracene per mg of charcoal was sufficient for the performance of biological experiments. However, it can be assumed that the value for the saturation of adsorption will not be much higher than the value given here. Assuming an active surface of 200 m^2 per gram of charcoal (*10*), and assuming the diameter of the 1:2:5:6-dibenzanthracene to be of the order of magnitude of 10 A, 0.5 grams of the hydrocarbon adsorbed on this surface will form a monomolecular layer. This monomolecular layer also explains why dibenzanthracene charcoal fails to show the characteristic fluorescence of this compound when irradiated with ultraviolet light.

The question arises as to whether the 1: 2: 5: 6-dibenzanthracene adsorbed on charcoal is held on the surface by physical forces or whether a chemical bond exists between the carbon and the hydrocarbon. It seems unlikely that chemical bonds exist, considering the fact that 1: 2: 5: 6-dibenzanthracene is chemically extremely inert and that most of the hydrocarbon can be brought into solution again by an excess of the solvent.

The forces that hold the 1: 2: 5: 6-dibenzanthracene on the surface of the charcoal are illustrated by the fact that the equilibrium of the hydrocarbon for the system dibenzanthracene charcoal-ether (e. g., 20 mg of dibenzanthracene charcoal in 50 cc of ether) is 0.5 mg per mg of charcoal and 1×10^{-2} mg per cc of ether (determined spectrographically) for the preparation as described above.[3] This equilibrium is reached rapidly after mixing and does not change after standing or vigorous shaking.

Likewise the equilibrium of the hydrocarbon was measured for the system dibenzanthracene charcoal-horse serum. It was found that less than 1×10^{-4} mg of the hydrocarbon per cc of serum (1×10^{-4} mg per cc being the limit of sensitivity of the spectrographic method in this case) are released from the charcoal into the serum.[4] Mouse serum differs little from horse serum with respect to solubility of 1: 2: 5: 6-dibenzanthracene.

The 1: 2: 5: 6-dibenzanthracene adsorbed on charcoal is designated as dibenzanthracene charcoal throughout this communication.

EXPERIMENTAL

As a preliminary experiment, mice of strain C_3H were injected with dibenzanthracene charcoal, or control material, in order to determine whether the compound retained its carcinogenic power after being adsorbed. The protocol of this experiment is presented below.

[3] A saturated solution of 1: 2: 5: 6-dibenzanthracene in ether will contain approximately 0.75 mg of the hydrocarbon per cc of ether at room temperature.

[4] A saturated solution of 1: 2: 5: 6-dibenzanthracene in horse serum contains 1.5×10^{-3} mg of the hydrocarbon per cc of serum.

Experiment 1

Sixty-five mice of strain C_3H were used. These were divided into four groups and injected subcutaneously in the right axilla on July 9, 1936, as follows:

Group A.—To 5 cc of a 50 percent solution of glycerin in water were added 150 mg of dibenzanthracene charcoal. Since each mg of charcoal contained 0.5 mg of the carcinogenic agent, there were 50 mg of 1: 2: 5: 6-dibenzanthracene in the suspension. The preparation was used to inject 11 female mice, each animal receiving 0.2 cc of the glycerin suspension subcutaneously; hence, each received 2 mg of 1: 2: 5: 6-dibenzanthracene adsorbed on 4 mg of charcoal.

Group B.—To 5 cc of a 50 percent solution of glycerin in water were added 50 mg of crystalline 1: 2: 5: 6-dibenzanthracene. This suspension was used to inject 10 female mice, each of which was given 0.2 cc of the preparation containing 2 mg of the compound. These mice served as controls for those of group A.

Group C.—To 25 cc of a horse-serum dispersion of 1: 2: 5: 6-dibenzanthracene containing 1 mg of the hydrocarbon in each cc were added 100 mg of activated charcoal. The mixture was shaken, allowed to stand for 10 minutes at room temperature, and then injected into mice. Twenty-four male mice each received 1 cc of the mixture; thus, each was given 1 mg of 1: 2: 5: 6-dibenzanthracene and 4 mg of charcoal.

Group D.—Each of 20 male mice was injected with 1 cc of a horse-serum dispersion of 1: 2: 5: 6-dibenzanthracene. These mice were used as controls for those of group C.

Mice of groups C and D were employed to determine whether the presence of charcoal might influence the time of appearance of induced tumors. Previous work (*1*) had shown that 1 cc of horse-serum dispersion would induce subcutaneous sarcomas in 50 percent of strain C_3H mice within 24 weeks. The results of the experiment are presented in table 1.

In table 1 it is seen that dibenzanthracene charcoal produced subcutaneous tumors at the site of injection and that no pronounced difference occurred in the time of appearance of tumors induced by dibenzanthracene charcoal and crystalline dibenzanthracene. The table also shows that of the mice of group C which had received the horse-serum dispersion plus charcoal, 75 percent developed tumors within 24 weeks after injection, while of the control mice of group D which had received only the horse-serum dispersion, 50 percent developed tumors during the same period of time.

TABLE 1.—*Experiment 1: Time of appearance of subcutaneous tumors induced in strain C_3H mice by 1: 2: 5: 6-dibenzanthracene when injected as dibenzanthracene charcoal, crystals, horse-serum dispersion plus charcoal, or horse-serum dispersion*

Group	Preparation used and amount of dibenzanthracene injected	Number of mice used	Number of tumors, according to time, in weeks												Total number of tumors	Number died without tumors
			14	16	18	20	22	24	26	28	30	32	34	36		
A	Dibenzanthracene charcoal, 2 mg	11	----	1	3	----	1	2	1	----	2	----	----	----	10	1
B	Crystals in glycerin, 2 mg	10	1	----	1	----	----	4	2	----	----	----	----	----	8	2
C	Horse-serum dispersion plus charcoal, 1 mg	24	----	2	5	5	2	4	1	1	2	1	----	----	23	1
D	Horse-serum dispersion, 1 mg	20	----	1	2	5	----	2	----	3	1	1	1	1	17	3

These results were probably due to the presence of charcoal in the mice of group C which may have held some of the hydrocarbon at the injection site, or may have acted as an irritant, thus accelerating the appearance of tumors. This latter possibility, however, is unlikely in view of the experiments by Berenblum (*6*), who has shown that an irritant tends to inhibit the carcinogenic action of 1: 2: 5: 6-dibenzanthracene and unpublished experiments performed in this laboratory in which the addition of kaolin or kieselguhr to a lard-solution of dibenzanthracene failed to bring about the earlier appearance of induced tumors.

When the tumor-bearing mice of groups C and D came to autopsy, additional evidence was found which suggested that charcoal kept the carcinogenic agent from spreading throughout the bodies of the group C animals, for of 9 mice of group D which developed subcutaneous sarcomas at the site of injection, 20 weeks or more after injection, 5 also had primary induced lung carcinomas, while of 11 mice of group C which developed tumors at the injection site during the same period of time none had developed lung growths. It has been recorded (*1*) that subcutaneous injection of a horse-serum dispersion of 1: 2: 5: 6-dibenzanthracene induces pulmonary tumors in strain C_3H mice and the findings in group D mice of this experiment confirm the previous observation.

Though it might seem unjustifiable to state that charcoal held the 1: 2: 5: 6-dibenzanthracene at the injection site, yet the paucity of lung tumors, together with the earlier appearance of subcutaneous growths in group C mice, strongly suggests that this was the case.

Further results of interest were procured following subcutaneous injection of dibenzanthracene charcoal into mice of strain A. Since the lungs of strain A mice are known to be especially susceptible to the carcinogenic action of 1: 2: 5: 6-dibenzanthracene when injected subcutaneously as a lard solution (*3*), it was decided to inject dibenzan-

thracene charcoal into the subcutaneous tissues of these mice to ascertain whether the adsorbed compound would bring about the appearance of pulmonary tumors.

Strain A female mice, 3 months of age, were given dibenzanthracene charcoal or crystalline dibenzanthracene at the same time and in the same manner as mice of groups A and B of Experiment 1: 12 each received 2 mg of the hydrocarbon adsorbed on 4 mg of charcoal and 10 served as controls when each received 2 mg of crystalline dibenzanthracene. From July 9, 1936, which was the time of injection, to January 22, 1937, only 2 mice of each group developed induced subcutaneous sarcomas. In the dibenzanthracene charcoal mice these tumors arose 18 and 28 weeks after injection and neither mouse had lung tumors when autopsied, while in the mice injected with crystalline material the tumors were noted 26 and 28 weeks after injection, and both mice also had multiple lung tumors. The production of only 4 subcutaneous tumors in strain A mice indicates that these animals were far more resistant to the carcinogenic agent than mice of strain C_3H.

On January 22, 1937, more than 6 months after injection, all surviving strain A mice were sacrificed and their lungs examined carefully for the presence of macroscopic tumors. Of the 10 dibenzanthracene charcoal animals, 5 were found to be free from lung tumors and 5 had but a single lung tumor, while of the 8 crystal-injected mice, all had large multiple lung tumors. Previous investigations (*2*) had revealed that 1 mg of crystalline dibenzanthracene suspended in a glycerin solution and injected subcutaneously into mice of strain A induced multiple lung tumors in practically all the animals within 3 months. Hence, the scarcity of pulmonary tumors within the dibenzanthracene charcoal-injected mice suggests that the carcinogenic agent remained adsorbed on the charcoal at the site of injection, thereby preventing its spread through the body of the injected animal.

This explanation of the results is substantiated by the recent observations of Lettinga,[5] who found that large amounts of 1:2:5:6-dibenzanthracene induced many lung tumors in susceptible mice, while small amounts induced very few such tumors. Kennaway and Kennaway (*8*) interpret these results as suggesting "very strongly an overflow of carcinogenic material either from the actual site of injection or from some organ where these compounds undergo chemical change."

Having found that dibenzanthracene charcoal induced tumors at the site of injection, the next step was to carry out the projected lines of experimentation by localizing the material in the lungs of mice. It

[5] Up to the present time, Lettinga's original publication has not been read and efforts to locate it have failed. The information concerning this work was obtained from the publication of Kennaway and Kennaway (*8*)

is known that a particulate substance such as charcoal, when injected into the blood stream, tends to localize in the lungs. After intravenous injection in these investigations, the lungs of the mice were black with charcoal and histological sections showed many small vessels engorged with the particulate material. The experiment in which charcoal was injected intravenously into mice is described in the following:

Experiment 2

Female mice of strain A, all of which were approximately 4½ months old were used. The mice were divided into four groups and injected on January 14, 1937, as follows:

Group A.—This group consisted of 28 mice, each of which received an intravenous injection of 0.5 cc of a horse-serum dispersion of 1: 2: 5: 6-dibenzanthracene containing 0.5 mg of the hydrocarbon.

Group B.—There were 36 mice, each of which received an intravenous injection of 1.5 mg of dibenzanthracene charcoal suspended in 0.5 cc of sterile physiological saline. Thus, each was given 0.5 mg of 1: 2: 5: 6-dibenzanthracene adsorbed on 1 mg of charcoal.

Group C.—This included 36 mice, each of which received an intravenous injection of 1 mg of charcoal suspended in 0.5 cc of sterile physiological saline.

Group D.—Twelve mice were set aside as normal untreated controls. In order to detect the appearance of lung tumors, two mice of each of the first three series were killed at weekly intervals, beginning 1 week after the intravenous injections. It has been noted during the course of experiments performed in this laboratory that when strain A mice of the same age are given injections of 1: 2: 5: 6-dibenzanthracene, lung tumors arise simultaneously in practically all the animals. This uniformity in the latent period of induced lung tumors presents an excellent opportunity for carrying out investigations pertaining to the time of appearance of these growths. It was believed, therefore, that weekly examination of the lungs of two mice in a given group would give an accurate idea as to when lung tumors appeared in most individuals of the same group and the results of the experiment proved this to be the case. In the interest of brevity the results of the weekly autopsies are presented in respect to the findings in each group. These were as follows:

Group A.—Injected with horse-serum dispersion. All lungs were negative until the fifth week after injection, when both showed several small nodules. From the sixth up to and including the fourteenth week following the injection, when the last two mice were killed, all the animals had multiple lung nodules.

Group B.—Injected with dibenzanthracene charcoal. Up to and including the eighth week, all the lungs were tumor-free, but the

ninth week both lungs showed a single lung nodule. From the ninth to the sixteenth week both sets of lungs contained several lung nodules, and from the sixteenth to the eighteenth week all showed multiple lung tumors.

Group C.—Injected with charcoal. These mice served as controls for those of group B. A single lung nodule was found in one of the two sets of lungs 7, 8, and 14 weeks after injection. No lung tumors were found in mice killed from the fourteenth to the eighteenth week after injection.

Group D.—Normal untreated controls. Three of these mice were killed 14 weeks after the beginning of the experiment; none had lung tumor. The remaining nine were killed 19 weeks after the experiment was started, and of these, six were tumor-free and three had a single lung tumor.

The results of the experiment may be summarized as follows: When 0.5 mg of 1: 2: 5: 6-dibenzanthracene was injected intravenously as a horse-serum dispersion, it evoked macroscopic lung tumors in strain A mice within 5 weeks; when 0.5 mg of the compound was adsorbed on 1 mg of charcoal and injected intravenously as a suspension in 0.5 cc of saline, it induced macroscopic lung tumors within 9 weeks; while 1 mg of charcoal suspended in 0.5 cc of saline had very little, if any, effect in producing lung tumors.

The findings show that 1: 2: 5: 6-dibenzanthracene is capable of inducing lung tumors in susceptible mice when it is adsorbed on charcoal and localized in the lungs via the blood stream. However, the fine particles of the compound present in the horse-serum dispersion were considerably more effective in this respect than was the dibenzanthracene charcoal. It will be noted that dibenzanthracene charcoal induced lung tumors in strain A mice within 9 weeks, though it failed to evoke tumors in the subcutaneous tissues of 10 mice of the same strain which were kept for more than 6 months after injection. This again shows that the lungs of strain A mice are more susceptible to the carcinogenic action of 1:2:5:6-dibenzanthracene than are their subcutaneous tissues.

Campbell (7) has found that the inhalation of road dust "minus tar, as removed by benzene" produces lung tumors in susceptible mice, but fewer lung tumors are induced than when tar is present in the inhaled dust. His observations are of interest when compared with the inability of intravenously injected charcoal to produce lung tumors in strain A mice. The difference in the results is probably due to the relatively short period of time (18 weeks) the mice were kept under observation in this laboratory, for Campbell allowed his mice "to live their allotted span of life." From the results of his experiments with both tar-containing and tar-free road dust there are excellent indications that the presence of charcoal alone might accelerate the appear-

ance of lung tumors in strain A mice, provided the animals are kept for a sufficient period of time. Perhaps the special susceptibility of the lungs of some mice to induced tumors, which is known (*4, 5*) to be inherited in accordance with genetic principles, is an important factor involved when lung tumors are produced by agents which are not considered to be carcinogenic.

The uniformity in the latent period of induced lung tumors in mice also presents an opportunity for histological studies of the development of induced growths. Accordingly, the lungs removed from all mice of Experiment 2, ranging from 1 to 18 weeks after injection of the carcinogenic compound or charcoal, have been prepared for histological studies which are now in progress.

SUMMARY AND CONCLUSIONS

When 1: 2: 5: 6-dibenzanthracene was adsorbed on charcoal and injected subcutaneously into strain C_3H mice, it produced tumors at the injection site.

When charcoal was added to a horse-serum dispersion of 1: 2: 5: 6-dibenzanthracene and the resulting mixture injected subcutaneously into strain C_3H mice, tumors arose more rapidly at the injection site than in control mice injected subcutaneously with the horse-serum dispersion. Induced lung tumors were found in mice injected with the horse-serum dispersion but such tumors were not observed in mice injected with the horse-serum dispersion to which charcoal had been added. These results suggest that charcoal held the carcinogenic compound at the site of injection.

When dibenzanthracene charcoal was injected subcutaneously into strain A mice, it induced tumors at the site of injection in but a few mice, which indicates that the subcutaneous tissues of mice of strain A are more resistant than those of strain C_3H to the carcinogenic action of dibenzanthracene charcoal. Subcutaneous injection of dibenzanthracene charcoal into strain A mice induced very few, if any, lung tumors which is evidence that the dibenzanthracene was held firmly by the charcoal. This is regarded as further evidence that lung tumors are induced in mice by a direct action of the carcinogenic agent upon the lung tissues.

When dibenzanthracene charcoal was injected intravenously into strain A mice it induced lung tumors within 9 weeks, while intravenous injection of an equal amount of 1: 2: 5: 6-dibenzanthracene as a horse-serum dispersion induced lung tumors in strain A mice within 5 weeks. Intravenous injection of charcoal into strain A mice failed to induce any appreciable number of lung tumors within 18 weeks after injection.

27244°—37——3

The localization of dibenzanthracene charcoal in the lungs via the blood stream and the production of tumors by dibenzanthracene charcoal in the lungs show that lung tumors can be produced in strain A mice by placing the carcinogenic agent in contact with lung tissues.

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DEATHS DURING WEEK ENDED DEC. 11, 1937

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Dec. 11, 1937	Corresponding week, 1936
Data from 86 large cities of the United States:		
Total deaths	8,552	8,790
Average for 3 prior years	8,618	
Total deaths, first 49 weeks of year	419,590	420,674
Deaths under 1 year of age	558	521
Average for 3 prior years	546	
Deaths under 1 year of age, first 49 weeks of year	26,873	27,101
Data from industrial insurance companies:		
Policies in force	70,452,399	68,870,782
Number of death claims	12,820	12,992
Death claims per 1,000 policies in force, annual rate	9.5	9.9
Death claims per 1,000 policies, first 49 weeks of year, annual rate	9.7	9.7

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers

In these and the following tables a zero (0) is to be interpreted to mean that no cases or deaths occurred, while leaders (------) indicate that cases or deaths may have occurred although none was reported.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 18, 1937, and Dec. 19, 1936

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec 18, 1937	Week ended Dec 19, 1936	Week ended Dec 18, 1937	Week ended Dec. 19, 1936	Week ended Dec 18, 1937	Week ended Dec 19, 1936	Week ended Dec 18, 1937	Week ended Dec 19, 1936
New England States:								
Maine	2	4	------	7	42	53	0	1
New Hampshire	------	------	------	------	96	9	0	0
Vermont	------	------	------	------	130	1	0	0
Massachusetts	5	5	------	------	61	456	0	2
Rhode Island	1	------	------	------	1	158	2	0
Connecticut	5	2	------	3	5	116	0	0
Middle Atlantic States:								
New York	43	32	[1] 10	[1] 23	128	215	9	8
New Jersey	16	16	11	20	660	158	2	1
Pennsylvania	37	55	------	------	2,275	43	8	7
East North Central States:								
Ohio	22	45	6	5	267	22	4	8
Indiana	17	19	57	45	50	12	0	2
Illinois	30	37	17	113	935	27	5	9
Michigan	17	20	------	------	305	21	1	7
Wisconsin	1	1	51	86	141	34	0	0
West North Central States:								
Minnesota	1	15	2	------	------	25	0	1
Iowa	12	5	4	5	4	2	0	2
Missouri	35	10	44	85	976	7	1	1
North Dakota	1	1	18	8	11	------	0	0
South Dakota	------	------	------	------	------	1	0	0
Nebraska	8	8	------	------	------	3	0	0
Kansas	7	6	4	4	23	10	1	2
South Atlantic States:								
Delaware	------	12	------	------	2	53	0	0
Maryland [2]	22	10	16	14	5	128	0	7
District of Columbia	10	10	------	------	6	6	0	3
Virginia	24	36	------	------	127	46	4	7
West Virginia	18	19	49	109	237	43	8	1
North Carolina [3]	35	70	11	12	434	22	1	4
South Carolina [3]	7	8	359	353	71	20	2	2
Georgia [3]	25	19	------	209	------	------	1	2
Florida	20	12	4	9	35	3	0	8

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 18, 1937, and Dec. 19, 1936—Continued

Division and State	Diphtheria		Influenza		Measles		Meningococcus meningitis	
	Week ended Dec. 18, 1937	Week ended Dec. 19, 1936	Week ended Dec. 18, 1937	Week ended Dec. 19, 1936	Week ended Dec 18, 1937	Week ended Dec. 19, 1936	Week ended Dec 18, 1937	Week ended Dec. 19, 1936
East South Central States:								
Kentucky	18	15	24	31	101	60	5	7
Tennessee [3]	11	28	96	59	119	8	5	3
Alabama [3]	23	23	258	117	12	2	10	1
Mississippi [2]	17	10	------	------	------	------	4	0
West South Central States:								
Arkansas	23	4	134	23	17	------	1	0
Louisiana	27	13	54	12	3	1	0	0
Oklahoma [4]	21	5	98	56	5	9	3	3
Texas [3]	48	74	409	561	36	72	6	2
Mountain States:								
Montana	------	1	------	65	1	------	0	2
Idaho	3	------	3	4	11	86	0	0
Wyoming	------	1	------	------	1	------	0	1
Colorado	7	4	------	1	61	1	0	0
New Mexico	6	4	------	1	49	44	2	0
Arizona	2	4	73	93	------	72	1	0
Utah [2]	1	------	------	------	69	70	0	3
Pacific States:								
Washington	1	8	------	------	38	20	1	2
Oregon	2	1	31	39	10	9	0	1
California	28	49	32	58	71	28	3	9
Total	654	721	1,965	2,225	7,631	2,176	80	114
50 weeks of year	26,697	27,511	288,665	153,949	283,762	280,038	5,226	7,187

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Dec 18, 1937	Week ended Dec. 19, 1936	Week ended Dec. 18, 1937	Week ended Dec. 19, 1936	Week ended Dec 18, 1937	Week ended Dec. 19, 1936	Week ended Dec. 18, 1937	Week ended Dec. 19, 1936	Week ended Dec 18, 1937
New England States:									
Maine	1	0	45	24	0	0	2	1	25
New Hampshire	0	0	7	3	0	0	1	0	9
Vermont	0	0	35	2	0	0	1	0	17
Massachusetts	0	0	207	178	0	0	4	1	217
Rhode Island	0	0	31	38	0	0	1	0	------
Connecticut	0	0	77	57	0	0	1	3	43
Middle Atlantic States:									
New York	0	2	410	496	0	47	6	8	375
New Jersey	1	0	94	103	0	0	3	0	152
Pennsylvania	0	0	428	417	0	0	12	4	320
East North Central States:									
Ohio	1	5	274	274	2	2	1	4	64
Indiana	0	0	167	172	102	1	0	2	11
Illinois	0	1	512	423	28	0	1	5	73
Michigan	0	1	363	370	0	1	4	8	179
Wisconsin	0	1	140	257	5	6	0	1	153
West North Central States:									
Minnesota	2	1	111	140	21	11	0	2	30
Iowa	0	0	233	99	63	15	1	1	28
Missouri	1	0	230	101	2	3	5	10	22
North Dakota	0	0	24	25	7	13	0	0	44
South Dakota	0	1	31	76	3	10	0	0	35
Nebraska	0	0	25	43	0	1	0	1	1
Kansas	1	5	160	250	11	7	0	2	81

See footnotes at end of table.

Cases of certain communicable diseases reported by telegraph by State health officers for weeks ended Dec. 18, 1937, and Dec. 19, 1936—Continued

Division and State	Poliomyelitis		Scarlet fever		Smallpox		Typhoid and paratyphoid fevers		Whooping cough
	Week ended Dec 18, 1937	Week ended Dec 19, 1936	Week ended Dec 18, 1937	Week ended Dec. 19, 1936	Week ended Dec. 18, 1937	Week ended Dec. 19, 1936	Week ended Dec 18, 1937	Week ended Dec. 19, 1936	Week ended Dec. 18, 1937
South Atlantic States:									
Delaware	0	0	12	22	0	0	0	0	23
Maryland [2]	1	0	71	69	0	0	3	8	59
District of Columbia	0	0	16	16	0	0	0	3	10
Virginia	1	1	58	39	0	0	2	6	67
West Virginia	1	0	71	77	0	0	1	6	44
North Carolina [3]	0	0	50	65	1	2	4	1	192
South Carolina [3]	0	0	15	6	0	0	2	2	23
Georgia [3]	1	4	43	31	0	0	3	6	15
Florida	1	1	13	10	0	0	7	0	6
East South Central States:									
Kentucky	1	1	72	63	4	0	0	3	57
Tennessee [3]	0	1	45	45	1	0	1	8	24
Alabama [3]	1	3	20	20	0	0	1	5	9
Mississippi [2]	1	0	9	13	1	0	0	3	-------
West South Central States:									
Arkansas	2	3	25	17	1	0	2	0	19
Louisiana	2	1	15	16	0	0	12	8	14
Oklahoma [4]	1	4	76	11	0	0	1	2	16
Texas [3]	3	0	90	117	8	4	24	9	123
Mountain States:									
Montana	1	0	23	61	15	28	1	0	37
Idaho	0	0	11	48	20	0	0	3	6
Wyoming	0	0	12	12	11	1	0	0	14
Colorado	0	0	43	21	6	7	3	1	11
New Mexico	0	0	15	22	0	0	3	2	9
Arizona	0	0	9	15	0	0	0	1	16
Utah [2]	0	0	96	23	0	0	0	0	18
Pacific States									
Washington	0	1	35	47	12	1	0	2	87
Oregon	3	2	76	43	9	29	2	2	20
California	5	6	172	306	14	2	13	6	308
Total	32	45	4,806	4,783	347	191	128	135	3,106
50 weeks of year	9,391	4,452	214,311	224,182	10,444	7,144	14,827	14,387	-------

[1] New York City only.
[2] Week ended earlier than Saturday.
[3] Typhus fever, week ended Dec. 18, 1937, 47 cases, as follows: North Carolina, 3; South Carolina, 1; Georgia, 30; Tennessee, 2, Alabama, 6, Texas, 5
[4] Figures for 1936 are exclusive of Oklahoma City and Tulsa.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week:

State	Meningococcus meningitis	Diphtheria	Influenza	Malaria	Measles	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid fever
November 1937										
Alabama	19	145	354	172	18	20	6	96	1	17
Florida	6	109	27	59	98	2	3	34	4	2
Georgia	8	123	369	291	168	16	5	123	2	44
Indiana	6	132	102	-------	97	-------	3	579	73	20
Louisiana	2	108	82	76	2	6	12	56	4	33
Michigan	7	108	5	9	407	-------	13	1,714	7	13
Minnesota	8	52	3	-------	22	-------	21	518	52	4
New York	24	93	-------	11	390	-------	28	1,245	0	36
Ohio	15	189	65	2	908	-------	4	1,391	4	37
Pennsylvania	16	173	-------	2	4,409	-------	9	1,412	0	80
Vermont	0	7	-------	-------	295	-------	0	50	0	5

Summary of monthly reports from States—Continued

November 1937

Disease / State	Cases
Actinomycosis	
Michigan	1
Anthrax:	
Louisiana	1
New York	1
Pennsylvania	1
Chicken pox:	
Alabama	93
Florida	25
Georgia	129
Indiana	233
Louisiana	12
Michigan	1,639
Minnesota	690
New York	1,747
Ohio	1,708
Pennsylvania	3,698
Vermont	287
Conjunctivitis, infectious:	
Georgia	7
Dengue:	
Florida	1
Georgia	1
Diarrhea and enteritis:	
Ohio (under 2 years)	17
Dysentery:	
Alabama (amoebic)	1
Florida (amoebic)	1
Georgia (amoebic)	5
Georgia (bacillary)	3
Louisiana (amoebic)	2
Louisiana (bacillary)	5
Michigan (amoebic)	6
Michigan (bacillary)	12
Minnesota (amoebic)	5
New York (amoebic)	8
New York (bacillary)	106
Pennsylvania (amoebic)	1
Pennsylvania (bacillary)	3
Encephalitis, epidemic or lethargic.	
Alabama	1
Georgia	1
Louisiana	1
Minnesota	2
New York	7
Ohio	4
German measles:	
Alabama	3
Florida	1
Michigan	57
New York	62
Ohio	18
Pennsylvania	86
Hookworm disease:	
Florida	1,154
Georgia	2,359
Louisiana	326
Jaundice, infectious:	
Michigan	1
Lead poisoning:	
Ohio	7
Mumps:	
Alabama	22
Florida	16
Georgia	57
Indiana	16
Michigan	455
Ohio	188
Pennsylvania	2,041
Vermont	395
Ophthalmia neonatorum:	
Alabama	2
Florida	2
Louisiana	1
New York [1]	10
Ohio	61
Pennsylvania	11
Paratyphoid fever:	
Florida	1
Michigan	4
New York	8
Ohio	1
Puerperal septicemia:	
Ohio	5
Rabies in animals:	
Alabama	59
Florida	8
Indiana	40
Louisiana	36
Michigan	3
New York [1]	3
Rabies in man:	
Ohio	1
Septic sore throat:	
Florida	1
Georgia	50
Louisiana	5
Michigan	36
Minnesota	7
New York	57
Ohio	65
Tetanus:	
Alabama	7
Georgia	2
Louisiana	5
Michigan	3
New York	9
Ohio	2
Trachoma:	
Alabama	6
Minnesota	1
Pennsylvania	2
Trichinosis.	
New York	4
Pennsylvania	1
Tularaemia:	
Alabama	1
Florida	1
Indiana	4
Louisiana	2
Minnesota	1
Ohio	4
Pennsylvania	1
Typhus fever:	
Alabama	35
Florida	7
Georgia	72
Louisiana	3
Undulant fever:	
Alabama	2
Florida	3
Georgia	1
Indiana	2
Louisiana	5
Michigan	3
Minnesota	4
New York	16
Ohio	6
Pennsylvania	7
Vermont	2
Vincent's infection:	
Florida	83
Michigan	16
New York [1]	76
Whooping cough:	
Alabama	51
Florida	21
Georgia	59
Indiana	109
Louisiana	48
Michigan	702
Minnesota	274
New York	1,595
Ohio	579
Pennsylvania	1,446
Vermont	135

[1] Exclusive of New York City.

CASES OF VENEREAL DISEASES REPORTED FOR OCTOBER 1937

These reports are published monthly for the information of health officers in order to furnish current data as to the prevalence of the venereal diseases. The figures are taken from reports received from State and city health officers. They are preliminary and are therefore subject to correction. It is hoped that the publication of these reports will stimulate more complete reporting of these diseases.

Reports from States

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Alabama	1,995	6 97	442	1.54
Arizona	86	2 12	97	2 39
Arkansas	742	3 67	355	1.75
California	1,533	2.53	1,493	2.46
Colorado [1]				
Connecticut	273	1 57	148	.85
Delaware	205	7.92	27	1.04
District of Columbia	195	3 15	146	2.36
Florida [2]	2,316	14.10	258	1.57
Georgia	1,981	6.47	473	1.55
Idaho	78	1.61	45	.93
Illinois	1,894	2.41	1,461	1.86
Indiana	318	92	128	.37
Iowa	394	1.55	232	.91
Kansas	152	81	104	.55
Kentucky	634	2 20	363	1.26
Louisiana	498	2.35	105	.49
Maine	56	66	61	.72
Maryland	1,083	6 47	368	2 20
Massachusetts	424	.96	445	1.01
Michigan	722	1.51	538	1.12
Minnesota	307	1.17	312	1 18
Mississippi	1,908	9 50	2,565	12.78
Missouri	811	2 05	420	1.06
Montana [1]				
Nebraska	63	.46	121	.89
Nevada [3]				
New Hampshire	11	.22	11	.22
New Jersey	887	2 05	415	.96
New Mexico [2]	143	3 39	39	.92
New York	9,753	7.54	2,106	1.63
North Carolina	3,064	8 86	726	2.10
North Dakota	25	.36	45	.64
Ohio	1,253	1.87	444	.66
Oklahoma	677	2 68	481	1.90
Oregon	106	1.04	235	2.31
Pennsylvania [4]	1,860	1.84	289	.29
Rhode Island	87	1.28	36	.53
South Carolina [2]	355	1.91	436	2.34
South Dakota	38	.55	27	.39
Tennessee	931	3.25	429	1.50
Texas	743	1.21	279	.46
Utah	2	.04	10	.19
Vermont	20	.53	33	.87
Virginia	1,062	3.98	354	1.33
Washington	347	2.11	457	2 78
West Virginia [2]	437	2.39	183	1.00
Wisconsin	27	.09	113	.39
Wyoming [2]				
Total	40,496	3.20	17,855	1 41

Reports from cities of 200,000 population or over

Akron, Ohio [1]				
Atlanta, Ga	254	8.85	136	4 74
Baltimore, Md	702	8.51	227	2.75
Birmingham, Ala	300	10.63	104	3 68
Boston, Mass	151	1 91	153	1 93
Buffalo, N. Y	190	3.21	103	1 74
Chicago, Ill	1,058	2.97	968	2 71
Cincinnati, Ohio	135	2.90	62	1.33
Cleveland, Ohio	215	2.31	94	1.01
Columbus, Ohio	65	2.13	24	.79
Dallas, Tex	184	6.35	76	2 62
Dayton, Ohio	83	3.95	18	.86
Denver, Colo	51	1.72	37	1.25
Detroit, Mich	815	1.82	240	1.39

See footnotes at end of table.

Reports from cities of 200,000 population or over—Continued

	Syphilis		Gonorrhea	
	Cases reported during month	Monthly case rates per 10,000 population	Cases reported during month	Monthly case rates per 10,000 population
Houston, Tex.[5]	187	5.58	29	.87
Indianapolis, Ind.[1]				
Jersey City, N. J.[1]				
Kansas City, Mo.	110	2.61	12	.28
Los Angeles, Calif.[1]				
Louisville, Ky.	185	5.71	160	4.94
Memphis, Tenn.	245	9.18	88	3.30
Milwaukee, Wis[1]				
Minneapolis, Minn.	80	1.64	82	1.69
Newark, N. J.	336	7.25	145	3.13
New Orleans, La.	77	1.61	47	.98
New York, N. Y.	8,366	11.45	1,518	2.08
Oakland, Calif.	55	1.81	44	1.45
Omaha, Nebr.	38	1.72	53	2.41
Philadelphia, Pa.	515	2.59		
Pittsburg, Pa.	114	1.67	30	.44
Portland, Oreg.[1]				
Providence, R. I.	43	1.66	21	.81
Rochester, N. Y.	36	1.07	52	1.54
St. Louis, Mo.	112	1.34	88	1.05
St. Paul, Minn.	29	1.03	14	.50
San Antonio, Tex.	108	4.30	80	3.18
San Francisco, Calif.	150	2.24	223	3.32
Seattle, Wash.	139	3.66	173	4.56
Syracuse, N. Y.	94	4.31	56	2.57
Toledo, Ohio	115	3.78	46	1.51
Washington, D. C.[6]	195	3.15	146	2.36

[1] No report for current month.
[2] Incomplete.
[3] Not reporting.
[4] Only cases of syphilis in the infectious stage are reported.
[5] Reported by Jefferson Davis Hospital.
[6] Reported by the Social Hygiene Clinic.

WEEKLY REPORTS FROM CITIES

City reports for week ended Dec. 11, 1937

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table. Weekly reports are received from about 700 cities, from which the data are tabulated and filed for reference.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	281	837	95	879	747	1,405	10	369	33	979	
Current week[1]	160	233	55	2,060	616	1,165	60	303	16	900	
Maine:											
Portland	0		0	1	2	0	0	0	0	19	17
New Hampshire:											
Concord	0		0	11	1	0	0	0	0	0	13
Nashua	0			0		0	0		0	0	7
Vermont:											
Barre	0		0	57	0	0	0	1	0	0	3
Burlington	1		0	0	0	0	0	0	0	0	10
Rutland	0		0	3	0	0	0	0	0	3	7
Massachusetts:											
Boston	0		3	41	16	51	0	4	0	5	225
Fall River	0		0	1	5	2	0	1	0	21	24
Springfield	0		0	0	1	9	0	0	0	15	42
Worcester	0		0	1	4	6	0	1	0	13	55
Rhode Island:											
Pawtucket	0		0	0	0	4	0	0	0	0	19
Providence	0		0	1	4	21	0	2	0	13	61
Connecticut:											
Bridgeport	0	1	0	1	3	10	0	0	0	3	28
Hartford	0		0	0	3	17	0	1	0	0	39
New Haven	0		0	0	1	3	0	1	0	5	47

[1] Figures for Newark estimated; report not received.

City reports for week ended Dec. 11, 1937—Continued

State and city	Diphtheria cases	Influenza Cases	Influenza Deaths	Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
New York:											
Buffalo	0	---	1	1	6	20	0	6	0	17	138
New York	29	13	7	20	86	141	0	62	4	109	1,397
Rochester	1	2	0	3	5	8	0	1	0	3	71
Syracuse	0	---	0	0	4	10	0	1	0	5	66
New Jersey:											
Camden	0	---	0	0	6	5	0	0	0	0	43
Newark	---	---	---	---	---	---	---	---	---	---	---
Trenton	0	---	0	94	0	1	0	2	0	8	30
Pennsylvania:											
Philadelphia	2	1	0	35	28	77	0	24	4	44	461
Pittsburgh	4	4	4	332	23	28	0	9	0	26	211
Reading	0	---	0	0	1	2	0	3	0	1	21
Scranton	0	---	---	13	---	0	0	---	0	1	---
Ohio:											
Cincinnati	5	---	0	3	16	19	0	6	0	3	138
Cleveland	1	16	2	73	14	49	0	10	0	39	187
Columbus	0	3	3	4	10	17	0	3	0	4	92
Toledo	4	3	0	16	7	5	0	10	0	8	81
Indiana:											
Anderson	0	---	0	0	2	3	0	0	0	1	14
Fort Wayne	2	---	0	0	4	1	0	0	0	0	30
Indianapolis	7	---	1	6	14	26	0	4	0	5	96
South Bend	0	---	0	3	3	4	0	0	0	0	20
Terre Haute	0	---	0	3	0	0	0	0	0	0	16
Illinois											
Alton	1	---	0	61	0	3	0	0	0	8	9
Chicago	13	12	1	246	43	163	6	28	0	38	721
Elgin	1	---	0	0	0	9	0	0	0	3	8
Moline	0	---	0	12	1	12	0	0	0	0	11
Springfield	0	---	0	1	1	14	4	0	0	0	23
Michigan:											
Detroit	12	---	3	143	19	93	0	20	0	16	271
Flint	1	---	0	1	4	14	0	0	0	33	35
Grand Rapids	0	---	0	4	3	23	0	1	0	11	36
Wisconsin.											
Kenosha	0	---	0	0	0	2	0	0	0	1	14
Madison	0	---	0	0	0	3	0	1	0	7	13
Milwaukee	0	1	1	48	11	22	0	1	0	27	109
Racine	0	---	0	0	0	7	0	0	0	2	9
Superior	0	---	0	1	0	0	0	0	0	0	7
Minnesota:											
Duluth	0	---	0	2	0	2	1	0	0	6	27
Minneapolis	0	---	1	3	1	27	0	0	0	13	113
St. Paul	2	---	0	2	2	2	21	1	0	2	52
Iowa:											
Cedar Rapids	0	---	---	0	---	1	0	---	0	0	---
Davenport	0	---	---	0	---	1	0	---	0	0	---
Des Moines	0	---	---	0	---	33	0	---	0	0	31
Sioux City	0	---	---	0	---	0	0	---	0	0	---
Waterloo	0	---	---	1	---	3	0	---	0	0	---
Missouri:											
Kansas City	0	---	1	0	9	25	0	7	0	3	119
St. Joseph	1	---	0	0	0	3	0	0	0	0	17
St. Louis	10	---	1	708	6	41	2	7	2	3	231
North Dakota:											
Fargo	0	---	0	0	0	2	0	0	0	3	6
Grand Forks	0	---	---	0	---	7	1	---	0	0	---
Minot	0	---	0	0	0	1	0	0	0	4	2
South Dakota:											
Aberdeen	0	---	---	0	---	0	0	---	0	2	---
Sioux Falls	0	---	0	0	0	2	1	0	0	0	14
Nebraska:											
Lincoln	1	---	---	0	---	0	0	---	0	0	---
Omaha	2	---	0	1	5	0	0	0	0	0	60
Kansas:											
Lawrence	0	---	0	0	0	0	0	0	0	6	7
Topeka	0	---	0	0	0	4	0	0	0	11	19
Wichita	0	1	1	2	3	7	0	0	0	5	19
Delaware:											
Wilmington	1	---	0	0	7	3	0	1	0	7	37
Maryland:											
Baltimore	16	7	3	2	21	23	0	13	0	34	232
Cumberland	0	---	0	0	2	0	0	0	0	0	9
Frederick	0	---	0	0	0	0	0	0	0	0	2
Dist. of Columbia:											
Washington	7	3	1	6	12	12	0	5	2	4	180

City reports for week ended Dec. 11, 1937—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Virginia:											
Lynchburg	1	------	0	0	2	1	0	0	0	0	9
Norfolk	0	------	0	1	6	12	0	3	0	1	27
Richmond	2	------	1	0	13	1	0	0	0	0	66
Roanoke	1	------	0	1	3	2	0	1	0	0	20
West Virginia:											
Charleston	1	1	0	0	3	1	0	1	0	0	24
Huntington	0	------	------	4	------	0	0	------	0	0	------
Wheeling	1	------	0	1	3	0	0	1	0	6	21
North Carolina:											
Gastonia	1	------	------	0	------	0	0	------	0	3	------
Raleigh	0	------	0	0	7	0	0	2	0	6	21
Wilmington	0	------	0	0	0	0	0	0	0	10	13
Winston-Salem	1	------	0	1	0	4	0	1	0	5	10
South Carolina.											
Charleston	0	39	1	4	6	0	0	0	0	0	30
Florence	0	------	0	0	1	0	0	0	0	1	10
Greenville	0	------	0	0	2	0	0	0	0	5	12
Georgia:											
Atlanta	1	41	3	26	0	7	0	4	0	7	87
Brunswick	0	------	0	0	0	0	0	0	0	0	5
Savannah	1	20	0	0	7	0	0	1	0	0	35
Florida											
Miami	1	1	0	16	8	1	0	2	0	1	36
Tampa	1	1	1	1	4	1	0	0	0	0	25
Kentucky:											
Ashland	0	------	0	0	1	0	0	1	0	0	9
Covington	1	------	0	0	5	0	0	0	0	0	15
Lexington	0	------	0	0	3	1	0	2	0	0	19
Louisville	0	4	1	50	13	15	0	5	0	4	73
Tennessee:											
Knoxville	1	8	1	3	3	0	0	0	0	0	31
Memphis	0	------	0	85	7	4	0	3	0	4	83
Nashville	3	------	0	1	8	2	0	0	0	0	62
Alabama.											
Birmingham	4	18	2	13	7	2	0	6	0	0	74
Mobile	0	------	0	0	4	0	0	5	0	0	29
Montgomery	1	5	------	0	------	1	0	------	0	0	------
Arkansas:											
Fort Smith	0	------	------	0	------	4	0	------	0	2	------
Little Rock	0	------	1	13	3	3	0	3	0	1	7
Louisiana											
Lake Charles	0	------	------	0	3	0	0	0	0	0	------
New Orleans	11	11	7	1	32	2	0	8	1	2	192
Shreveport	0	------	0	0	13	2	0	1	0	0	61
Oklahoma:											
Muskogee	1	------	------	0	------	3	0	------	0	0	------
Oklahoma City	0	------	2	0	8	0	0	2	0	0	45
Tulsa	1	------	------	0	------	5	1	------	0	8	------
Texas:											
Dallas	2	1	1	0	3	13	0	2	0	2	58
Fort Worth	1	------	1	0	7	4	0	0	0	0	42
Galveston	2	------	0	0	7	1	0	1	0	0	21
Houston	1	------	0	3	12	5	0	6	0	0	101
San Antonio	1	------	1	1	4	0	0	3	0	0	64
Montana:											
Billings	0	------	0	0	3	0	0	0	0	0	12
Great Falls	0	------	0	0	0	3	12	0	0	14	7
Helena	0	------	0	0	0	0	0	0	0	4	2
Missoula	0	------	0	0	0	0	0	0	0	0	6
Idaho:											
Boise	0	------	0	0	1	0	0	0	0	0	4
Colorado:											
Colorado Springs	0	------	0	0	1	2	0	1	0	0	12
Denver	4	------	0	33	5	12	0	6	1	1	97
Pueblo	0	------	0	1	0	5	1	0	0	3	7
New Mexico:											
Albuquerque	1	------	0	10	0	2	0	2	0	1	16
Utah:											
Salt Lake City	0	------	0	2	4	12	0	0	0	5	28
Washington:											
Seattle	0	------	0	1	3	3	0	2	0	21	75
Spokane	0	------	0	0	4	2	1	0	0	14	40
Tacoma	0	------	0	1	1	5	3	0	0	7	44
Oregon:											
Portland	6	3	0	0	2	9	0	0	0	4	65
Salem	0	2	------	1	------	1	0	------	0	0	------
California:											
Los Angeles	6	17	1	5	20	33	0	9	2	50	341
Sacramento	0	13	0	0	4	1	0	1	0	36	29
San Francisco	0	6	2	1	7	12	0	5	0	75	170

City reports for week ended Dec. 11, 1937—Continued

State and city	Meningococcus meningitis		Polio-mye-litis cases	State and city	Meningococcus meningitis		Polio-mye-litis cases
	Cases	Deaths			Cases	Deaths	
Connecticut:				Maryland.			
Hartford	1	0	0	Baltimore	1	1	0
New York.				Virginia			
Buffalo	1	0	0	Roanoke	0	1	0
New York	2	0	1	North Carolina:			
Pennsylvania:				Raleigh	1	2	0
Pittsburgh	1	1	0	Georgia			
Indiana.				Atlanta	0	1	0
Indianapolis	0	1	0	Tennessee·			
Michigan:				Knoxville	0	1	0
Detroit	1	0	0	Alabama:			
Wisconsin.				Birmingham	5	0	0
Milwaukee	0	0	1	Louisiana:			
Minnesota:				Lake Charles	1	0	0
Minneapolis	0	0	2	Shreveport	0	3	0
Iowa·				Texas:			
Des Moines	0	0	1	Dallas	1	0	0
Missouri				San Antonio	1	0	0
Kansas City	0	0	1	California·			
St Louis	0	0	1	Los Angeles	2	1	0
Nebraska:							
Omaha	1	0	0				

Encephalitis, epidemic or lethargic.—Cases: St. Louis, 1.

Pellagra.—Cases. Philadelphia, 2; Baltimore, 1; Lynchburg, 1; Atlanta, 3; Savannah, 2; Memphis, 1; Birmingham, 2.

Typhus fever—Cases: Savannah, 3.

FOREIGN AND INSULAR

CUBA

Provinces—Notifiable diseases—4 weeks ended November 13, 1937.—During the 4 weeks ended November 13, 1937, cases of certain notifiable diseases were reported in the Provinces of Cuba as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1	1	1	9		2	14
Chicken pox		2					2
Diphtheria	2	20	2	1		1	26
Leprosy		1			1	4	6
Malaria	47	176	117	135	17	103	595
Measles		4	4			1	9
Poliomyelitis		3				5	8
Tetanus	1						1
Tuberculosis	44	17	30	51	37	23	202
Typhoid fever	12	53	15	28	10	12	130
Yaws						11	11

DENMARK

Notifiable diseases—July-September 1937.—During the months of July, August, and September 1937, cases of certain notifiable diseases were reported in Denmark as follows:

Disease	July	August	September
Cerebrospinal meningitis	10	5	4
Chicken pox	13	7	3
Diphtheria and croup	70	56	86
Epidemic encephalitis	4	4	4
Erysipelas	184	242	285
German measles	19	6	5
Gonorrhea	922	1,061	991
Influenza	2,131	2,562	4,653
Malaria	8	4	5
Measles	55	49	145
Mumps	420	285	364
Paradysentery	166	425	138
Paratyphoid fever	13	50	20
Poliomyelitis	38	272	567
Puerperal fever	17	18	13
Scabies	724	911	1,332
Scarlet fever	514	705	1,181
Syphilis	59	50	64
Tetanus neonatorum	3	2	5
Tetanus, traumatic	1		
Typhoid fever	6	5	3
Undulant fever (Bact. abort. Bang)	51	50	38
Weil's disease	1	2	3
Whooping cough	711	638	782

ITALY

Communicable diseases—4 weeks ended October 10, 1937.—During the 4 weeks ended October 10, 1937, cases of certain communicable diseases were reported in Italy as follows:

Disease	Sept. 13-19		Sept. 20-26		Sept. 27-Oct. 3		Oct. 4-10	
	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected	Cases	Communes affected
Anthrax	33	26	42	37	32	26	31	25
Cerebrospinal meningitis	15	11	14	12	10	4	8	8
Chicken pox	53	37	68	51	49	35	80	54
Diphtheria	575	334	601	304	667	329	659	330
Dysentery	77	53	40	32	41	30	68	35
Hookworm disease	14	7	22	12	26	10	23	11
Lethargic encephalitis	2	2	2	2	1	1		
Measles	305	117	280	128	334	145	298	140
Mumps	102	58	77	47	52	36	60	38
Paratyphoid fever	220	142	191	142	151	106	156	130
Poliomyelitis	40	31	61	48	64	49	43	38
Puerperal fever	32	30	25	22	28	27	43	40
Scarlet fever	253	108	258	144	266	134	289	143
Typhoid fever	1,438	683	1,316	626	1,242	584	1,127	564
Undulant fever	31	27	36	33	26	23	50	44
Whooping cough	246	123	252	91	178	89	224	82

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER

From medical officers of the Public Health Service, American consuls, International Office of Public Health, Pan-American Sanitary Bureau, health section of the League of Nations, and other sources. The reports contained in the following table must not be considered as complete or final as regards either the list of countries included or the figures for the particular countries for which reports are given.

CHOLERA

[C indicates cases; D, deaths; P, present]

Place		Apr. 25–May 29, 1937	May 30–June 26, 1937	June 27–July 31, 1937	Aug. 1–28, 1937	Week ended—												
						September 1937				October 1937					November 1937			
						4	11	18	25	2	9	16	23	30	6	13	20	27
China:																		
Canton	C			62	80	40	27	21	14	3	7	4						
Hangchow	C							8	4		41							
Hoihow	C			100														
Hong Kong	C			7	964	203	205	106	66	24	29	13	14	4	4	1	1	1
	D			7	497	126	116	66	36	26	16	4	13	4	3	1	3	
Kwangchow Wan	C				104					20	13	23	6		4	8		
	D				51					20			6		4	6		
Macao	C				286	64	72	38	16	9	12	6			1		1	
Manchuria:																		
Dairen	C									3	1	2						
Kwantung Leased Territory	C								3									
Mukden	C										2							
Nanking	C										[1] 63		[1] 42					
	D										[1] 8		[1] 6					
Shanghai	C				8	29	394	726	655	513	333	359	110	99	67	81	49	10
Swatow	C				8	8	10	6			13	9	11	11	24	19	42	
Tientsin	C									1	7							
Chosen	C								1									
Dutch East Indies—Celebes	C								[2] 6									
Federated Malay States	D			2														
India	C	14,149	11,113	13,893	18,259	4,316	2,754	2,834	2,299	1,623	2,254	2,463						
	D	7,366	5,454	6,495	7,976	1,939	1,257	1,422	1,150	836	1,139	1,191						
Assam	C	2,554	435	63	35	18	10	11	5	13	6	3	12	25	13	39	19	16
	D	1,205	274	34	25	6	5	1	4	3	4	5	6	7	11	23	13	6
Bassein	C	97	6	1														
Bombay Presidency	C	3,259	1,713	2,936	4,273	1,143	890	762	571	391	430	311	130	113	122			
	D	1,457	674	1,098	1,719	467	374	448	282	202	212	153	63	56	51			
Bombay	C	[3] 2		[3] 1		[3] 1												
Calcutta	C	732	173	92	77	14	10	13	19	16	23	13	21	10	19	21	18	
Central Provinces and Berar	C	83	318	62	176	85	90	59	52	154	214	177	211	104	79	93	102	82
Chittagong	C	143	34	5														
Madras Presidency	C	1,839	1,048	2,794	4,210	666	475	393	310	163	175		235	253				
	D	1,103	544	1,182	1,659	276	208	157	130	77	86		103	123				

Madras	C	1	6	16	64	20	25	25		17	15	35	23	16	32	61	44	
	D		3	6	26	5	6	7		7	4	14	13	5	7	9	4	
Negapatam	C	2	20		1		1	2				1						
	D		12	1				1										
Northwest Frontier Province	C				203			31	1	2	17							
Orissa Province	C	181	188	295	247	60			51	16	40	23	55	13	12	43		
Punjab	C	3	16	24	120	16	6	1	6									
Rangoon	C	12	7															1
Sind State	C	1			1	1												
Tuticorin	C	2	10															
India (French):																		
Chandernagor Territory	C	8	2	2							2			2				
Karikal Province	C						1											
Pondichery Province	C	1						1					1					
Indochina (French): [4]																		
Annam	C											4	1	32	173	191		
Haiphong	C								56	120	204	169	68	16	16	12	10	6
	D								30	75		2	82		18	9		
Hanoi	C									5	35	71	86	87	83	95	106	77
Tonkin Province	C								320	683	1,029	973	759	735	1,074	1,268		
Japan: [5]																		
Hiroshima	C								32	5								
Kobe	C									1								
Okayama Prefecture	C										1	4						
Taku	C							1			3							
Tokuyama	C										10							
Tokyo	C										1							
Siam:																		
Bangkok	C	338	28	5	1							2						
Provinces	C	796	255	151	42	8	5		3	2	2	2	1					
Straits Settlements: Penang	C		1															

On vessels:

S. S. *Ellenga* at Penang from Negapatam	15 cases	June 2, 1937
S. S. *Aronda* at Rangoon from Calcutta	1 case	June 3, 1937
S. S. *Badahur* at Rangoon from Calcutta	1 case	June 11, 1937
S. S. *Talamba* at Port Swettenham from Madras	2 cases	June 27, 1937
S. S. *Chungking* at Bangkok from Hoihow	1 case	July 15, 1937
S. S. *Kwantung* at Hong Kong from Hoihow	1 case	July 21, 1937
S. S. *Kiangsu* [6] at Singapore from Hong Kong	1 case	July 22, 1937
S. S. *Eagle* at Hong Kong from Kongmoon	1 case	July 27, 1937
S. S. *Muinam* at Singapore from Hong Kong	2 cases	Aug. 16, 1937
S. S. *Sandviken* at Hong Kong	Present	Aug. 18, 1937

On vessels—Continued

S. S. *Haiching* at Hong Kong	Present	Aug. 18, 1937
S. S. *Talma* at Singapore from Hong Kong	1 case	Aug. 20, 1937
S. S. *Cremer* at Singapore from Amoy, Hong Kong, and Swatow	1 case	Aug. 24, 1937
S. S. *Tyndareus* at Kobe from Hong Kong and Dairen	1 case	Aug. 27, 1937
S. S. *Manila Maru* at Moji from Hong Kong	1 case	Aug. 31, 1937
S. S. *Anking* at Singapore from Hong Kong	1 case	Sept. 10, 1937
S. S. *Sphinx* at Singapore from Hong Kong	1 case	Sept. 15, 1937
S. S. *Kiungchow* at Hong Kong from Shanghai	3 cases	Oct. 3, 1937

[1] For 2 weeks.
[2] El Tor strain.
[3] Imported.
[4] For reports prior to Apr. 25, 1937, see previous issues of PUBLIC HEALTH REPORTS.
[5] A report states that up to Sept. 30, cholera was reported in Japan, as follows. Hiogo Prefecture, 1 case, 1 death, Hiroshima Prefecture, 40 cases, 14 deaths; Yamaguchi Prefecture, 2 cases, 1 death.
[6] In addition, for week ended July 28, 3 cases with 2 deaths in contacts.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE[1]

[C indicates cases; D, deaths, P, present]

Place		Apr. 25–May 29, 1937	May 30–June 26, 1937	June 27–July 31, 1937	Aug. 1–28, 1937	Week ended— September 1937: 4	11	18	25	October 1937: 2	9	16	23	30	November 1937: 6	13	20	27
Algeria: Algiers	C			[3] 1														
Argentina. (See table below.)																		
Belgian Congo	C													[3] 2				
Bolivia. (See table below.)																		
Brazil. (See table below.)																		
British East Africa.																		
Kenya	C	7	24	42	16	4	3	3	1	10	1	1	1	2	7		3	
Tanganyika	C	11	6		1													
Uganda	C	48	39	47	32	6	5	26	13	12	9	12	8	10	28	12	17	
	D	43	38	43	32	6	5	26	11	12		12	7	9	20	12	14	
Ceylon:																		
Central Province—Nuwara Eliya District	C		1															
Chilaw District	C	1																
Colombo	C	2	2		1									1				1
	D	2	2		1									1				1
Plague-infected rats		1	3	1				2			1	1	1					
China:[4]																		
Fukien Province.[4]																		
Hsiatangchi.[4]																		
Manchuria.[4]																		
Dahomey. (See table below.)																		
Dutch East Indies:																		
Java and Madura	C	260	205	226	215	55	65											
	D	255	205	224	215	55	64											
Pasoeroean	C			1														
Ecuador (see also table below):																		
Guayaquil	C	8	4		1					1		1						
	D	3	3	1	1					1			1					
Plague-infected rats		27	13	2	2	1						2					3	
Egypt:																		
Asyut Province	C	9	1												1			
Girga Province	C	3	1											1				

Hawaii Territory: Plague-infected rats:																		
Hawaii Island—Hamakua District:																		
Hamakua Mill Sector [5]					8	3			1		1			2			1	3
Honokaa Sector				3														
Paauhau Sector		4	7	1	1	1								1		3		2
Maui Island—Makawao District—Omaopio [5]						1												
India	C	2,502	316	558	962	370	356	483	488	421	334	320						
	D	1,690	203	356	522	192	172	200	183	157	158	129						
Bassein	C	7	6	1	2		2											
Plague-infected rats		2	2	1														
Bombay Presidency	C	35	24	33	43	21	8	22	11	17	18	13	11	23	20			
	D	16	9	20	25	11	9	12	10	13	10	12	4	9	9			
Central Provinces and Berar	C	363	7	10	85	35	50	59	141	31	121	96	48	286	120	84	183	205
Cochin	C							2							1			
Karachi	C	1				4	4	4										
Madras Presidency	C	23	6	106	203	24	33	41	13	20		30	17					
	D	12	3	63	98	14	20	17	8	8		14	11					
Punjab	C	2			17													
Rangoon	C	2		[6] 2	5													
Sind State	C	2				4	4											
Indochina (French) (see also table below):																		
Pnom-Penh	C		1															
Sadec	C			1			1											
Madagascar. (See table below.)																		
Malta	C	4																
Peru. (See table below.)																		
Senegal:																		
Dakar	C		1	1				1										
Thies	C	2	4															
Tivaouane	C	1		1														
Siam	C									57								
	D									57								
Syria. Ras el Ain region	D		[7] 12															
Tunisia: Tunis	C	1		2														
Plague-infected rats		5		1														
Union of South Africa	C						[8] 1						[8] 1					

[1] Including plague in the United States and its possessions.
[2] Suspected.
[3] Includes 1 case of pneumonic plague.
[4] Plague has been reported in China as follows: Information dated Aug. 18 reports an outbreak in West Hsingan (Khingan) and Southern Lungkiang Provinces. Under date of June 1, estimated deaths from plague in Fukien Province reported to be 3,000 to 4,000. According to a report dated May 10 several hundred deaths from bubonic plague occurred in Hsiatangchi. Information dated Sept 2 states that 115 cases and 105 deaths occurred in Manchuria.
[5] Plague has also been reported in Hawaii Territory as follows: Week ended Aug 14, 1 lot of 5 rats and 1 lot of 3 mice, by mass inoculation, and week ended Dec 4, 7 plague-infected rats in Hamakua Mill Sector, Hamakua District, Island of Hawaii; week ended Nov. 20, 10 rats by mass inoculation in Omaopio, and week ended Dec. 4, 1 plague-infected rat in Makawao District, Island of Maui.
[6] Imported.
[7] Pneumonic plague.
[8] For 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

PLAGUE—Continued

[C indicates cases, D, deaths, P, present]

Place	Apr. 25–May 29, 1937	May 30–June 26, 1937	June 27–July 31, 1937	Aug. 1–28, 1937	Week ended— September 1937				October 1937					November 1937			
					4	11	18	25	2	9	16	23	30	6	13	20	27
United States: [9]																	
California: [9] [10] [11]																	
Eldorado County — Plague-infected fleas.																	
Fresno County [10] C					1												
Plague-infected fleas.																	
Plague-infected ground squirrels								3									
Placer County [11]—Plague-infected fleas																	
San Bernardino County—Plague-infected fleas.																	
San Mateo County—Plague-infected fleas, lice, and ticks.																	
Idaho: [9] Bannock County—Plague-infected ground squirrels		(12)															
Montana:																	
Beaverhead County—Plague-infected ground squirrel			1														
Madison County — Plague - infected squirrels				2													
Nevada: [9]																	
Douglas County C		1															
Plague-infected fleas.																	
Ormsby County — Plague - infected fleas and lice.																	
Oregon: [9]																	
Grant County — Plague - infected ground squirrel	1																
Lake County—Plague-infected fleas.																	
Wallowa County — Plague- infected ground squirrel	1	1															
Utah: [9]																	
Morgan County — Plague - infected fleas.																	
Wasatch County — Plague - infected ground squirrel				1													
Washington: [9] Adams County—Plague-infected fleas and lice.																	

Place		May 1937	June 1937	July 1937	August 1937	September 1937	October 1937
Argentina:							
Cordoba Province	C					1	
Mendoza Province	C			[7] 9			
Salta Province	C				[7] 1		
Santiago del Estero Province	C			[7] 6			
Bolivia: La Paz Department	C	[7] 2	[7] 2				
Brazil: Pernambuco State	C				5		
Dahomey	C		1				
Indochina (French) (see also table above):							
Cambodia	C	4	4	2			
Cochinchina	C			2		1	

Place		May 1937	June 1937	July 1937	August 1937	September 1937	October 1937
Madagascar (central region)	C	45	23	25	22	48	59
	D	43	22	24	22	47	59
Peru	C	12	4	7	3	5	9
Lambayeque Department	C	1	1	1	2	2	1
Libertad Department	C	3	2	4	1		2
Salaverry	C			3			
Lima Department	C	2	1	2		3	6
Piura Department	C	6					

[7] Pneumonic plague.

[9] Plague infection proved in insect hosts as follows: *California*—Eldorado County, Aug. 31; Fresno County, Oct. 7-Nov. 5; Placer County, June 22; San Bernardino County, July 12-Sept. 8; San Mateo County, July-Aug. 27. *Idaho*—Bannock County, July 8. *Nevada*—Douglas County, July 29-31; Ormsby County, July 2-Aug 20. *Oregon*—Lake County, May 7; Wallowa County, June 25. *Utah*—Morgan County, reported Aug. 10. *Washington*—Adams County, Apr. 29, 1937.

[10] For 5 weeks ended Nov. 6, plague infection proved in pooled tissue from squirrels, chipmunks, and mice in Fresno County.

[11] For week ended Oct. 9, plague infection proved in pooled tissue from squirrels, chipmunks, and rats, and week ended Oct. 30, pooled tissue from squirrels, in Placer County.

[12] Number unspecified.

SMALLPOX

[C indicates cases; D, deaths; P, present]

Place		Apr. 25–May 29, 1937	May 30–June 26, 1937	June 27–July 31, 1937	Aug. 1-28, 1937	Week ended— September 1937				October 1937					November 1937			
						4	11	18	25	2	9	16	23	30	6	13	20	27
Algeria:																		
Algiers Department	C	1	2								1							
Oran Department	C	3	1															
Argentina. (See table below.)																		
Belgian Congo. (See table below.)																		
Bolivia. (See table below.)																		
Brazil:																		
Bahia (alastrim)	C	10	2	16	10	1	4	1		3								
Porto Alegre (alastrim)	D	1	1	2	2													
Recife (alastrim)	C						1											
British East Africa:																		
Kenya	C	1		116											100	223		
Tanganyika	C	93	57	65	186	76		44	1									

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C indicates cases; D, deaths, P, present]

Place		Apr. 25–May 29, 1937	May 30–June 26, 1937	June 27–July 31, 1937	Aug. 1-28, 1937	Week ended— September 1937 4	11	18	25	October 1937 2	9	16	23	30	November 1937 6	13	20	27
Canada:																		
Alberta	C		[1]1	5														
Quebec	C														[1]1			
Saskatchewan	C				[1]1													
China:																		
Amoy	C	1	1															
Canton	C	2																
Dairen	C	2	5	2	2													
Foochow	C	P	P	P	P		P		P		P		P					
Hangchow	C	1		1														
Hankow	C	11	4		1													
Hong Kong	C	16	7	9	82					1					1			5
Nanking	C	1	4															
Shanghai	C	54	18	29	2	1								1				
Swatow	C	5	2															
Tientsin	C	7	4															
Chosen. (See table below.)																		
Colombia (see also table below): Barranquilla	D		2	1						1				1				
Ecuador: Guayaquil	C	31	48	37	20		1	2		1		3	5	4	2			2
Egypt: Port Said	C		1	1														
Eritrea	C	1	3	2					28	52						7		
France. (See table below.)																		
Great Britain: England and Wales—Chester County	C																1	
Greece: Salonika	C	37	5	24														
Guatemala. (See table below.)																		
India	C	10,906	9,247	6,578	3,026	455	348	427	508	318	437	249						
	D	2,689	2,725	1,875	910	109	94	137	126	87	108	44						
Assam	C	384	238	107	98	14	19	12	13	18	7	9	6	5	5	10	5	17
Bombay Presidency	C	1,173	536	331	177	50	40	29	62	23	51	24	39	17	5			
	D	228	120	106	53	14	4	10	10	5	12	5	7	4	3			
Bombay	C	165	105	104	28	4	10	20	13	11	17	3	4	6	5	23	26	
	D	105	72	69	18	4	3	7	9	3	10	3	4	3	3	8	9	
Calcutta	C	106	21	14	40	10	4	7	7	3	3	4	4	6	5	5	5	
	D	47	19	10	16	6	2	5	4	2		3	4	5	1	8	4	
Central Provinces and Berar	C	452	202	153	61	5	13	3	23	10	5	2	4	5	4		1	2
Chittagong	C	1	[2]2	2														

Cochin	C	3																
Delhi	C			12	7							1						
Karachi	C	19	5	2		[2] 2									[2] 1		1	
Madras Presidency	C	483	130	462	415	113	58	65	82	67	64		96	77				
	D	98	31	104	95	13	14	19	16	16	11		13	11				
Madras	C	49	43	95	102	27	14	21	14	19	5	18	19	13	14	13	9	
Moulmein	C		[2] 1															
Northwest Frontier Province	C	30	46	171	76	8	2	17		1	35	17	87	14	112	70	20	178
Orissa Province	C	618	457	462	310	52			65	30	62	27	36	38	40	81	35	
Punjab	C	513	674	560	165	21		17	31	8	7	36	91	20	55	182	138	
Rangoon	C	3	1		[2] 1							1		2			4	1
Sind State	C	188	254	279	209	30	17	17	32	31	10	17	8	12	19	41	68	36
Indochina (French) (see also table below):																		
Haiphong	C															2		
Pnom-Penh	C	1	1															
Saigon-Cholon	C			1														
Iran	C		2		3										2			
Teheran	C	1			1													
Iraq	C	2		2	5													
Baghdad	C	1																
Italian Somaliland	C			1														
Japan:																		
Moji	C	3																
Osaka	C		[2] 1															
Mexico (see also table below):																		
Chihuahua	C			1			1											
Ciudad Juarez	D			1														
Durango	D	5	4	1						1								
Guadalajara	D	2	1															
Mazatlan	C		1	1														
Mexico, D. F	C	36		10	8	1	1		4	1						5	1	
Monterrey	C	1		1	1			2									1	
San Luis Potosi	D	1								1								
Torreon	C	22	12	7	3			1										
	D			11	7		1	1	1	1	1		1	2				4
Morocco. (See table below.)																		
Nigeria	C	281	111	229	[3] 71		1	10		6	10							
Nyasaland	C			1	12					9			4	18				
Panama Canal Zone: Colon	C									2								
Portugal (see also table below):																		
Lisbon	C	1	6	6	1	1	1	3		2		1				1	1	1
Oporto	C		1	1		1	1											
Senegal. (See table below).																		
Siam: Tak Province	C		3	3	1													
Sierra Leone	C	2	1		[3] 5						[1] 1		[1] 9					
Southern Rhodesia	C									4								
Sudan (Anglo-Egyptian)	C	13	39	8	6	2	2	13	10	8	7	8	20	21	7	58	13	10
Tunisia	C		4															
Turkey. (See table below.)																		
Unfederated Malay States: Kedah	C			P														
Uruguay	C		3															

[1] For 2 weeks.
[2] Imported.
[3] For 4 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

SMALLPOX—Continued

[C. indicates cases; D, deaths; P, present]

Place		May 1937	June 1937	July 1937	August 1937	September 1937	October 1937
Argentina	C						3
Belgian Congo	C	287		366	312	391	
Bolivia	C	48					
La Paz	C					30	
China: Manchuria—Harbin	C	4		1			
Chosen	C	27	1				
Colombia (see also table above)	C	51	108		[4] 209		
France	C	1					
Guatemala	C		2		1		
Indochina (French) (see also table above)	C	274	273	143	226	96	147
	D	95	50	30	63	12	28
Mexico (see also table above):							
Aguascalientes State	C					5	
Aguascalientes	C	1					
Campeche State	C					1	
Chihuahua State	C	2				4	
Coahuila State	C					2	
Durango State	C					15	
Guanajuato State	C					7	
Hidalgo State	C					1	
Jalisco State	C					5	
Guadalajara	C		1				
Mexico—Continued.							
Mexico State	C	1				3	
Mexico, D. F.	C	41	28	18	9	11	
Mexico City	D			3	1	2	
Michoacan State	C				4	37	
Nayarit State	C					1	
Nuevo Leon State	C					2	
Monterrey	C			1			
Queretaro State	C	10	8		1	5	
San Luis Potosi State—San Luis Potosi	C		1				
Sinaloa State	C					3	
Tabasco State	C					1	
Tlaxcala State	C					3	
Vera Cruz State	C					2	
Yucatan State	C			1			
Zacatecas State	C					1	
Morocco	C	1	1	4		1	1
Portugal (see also table above)	C	29				61	
	D	1				8	
Senegal	C	28	36	16			
Turkey	C	4	1				

On vessels:
- S. S. *G. G. Pasquier* at Singapore from Saigon — 1 case — May 7, 1937
- S. S. *Changte* at Thursday Island — 1 case — June 26, 1937
- S. S. *Empress of Japan* at Kobe from Manila — 1 case — Aug 11, 1937
- S. S. *Northern Prince* at New York from Rio de Janeiro — 1 case — Aug. 19, 1937

On vessels—Continued
- S. S. *Empress of Asia* at Honolulu — 1 case — Sept. 5, 1937
- S. S. *Castalia* at Suez from Karachi and Bombay — 1 case — Oct. 5, 1937
- S. S. *Egra* at Rangoon from Calcutta — 1 case — Nov. 16, 1937

[4] July and August.

TYPHUS FEVER

[C indicates cases; D, deaths, P, present]

Place		Apr. 25–May 29, 1937	May 30–June 26, 1937	June 27–July 31, 1937	Week ended— August 1937 7	Aug. 14	Aug. 21	Aug. 28	September 1937 4	Sept. 11	Sept. 18	Sept. 25	October 1937 2	Oct. 9	Oct. 16	Oct. 23	Oct. 30	November 1937 6	Nov. 13	Nov. 20
Algeria:																				
Algiers Department	C	78	79	197	4	6	13	7	6	1				20	2		16	18		[1] 27
Algiers	C	4	2	73	2		1										15			
Constantine Department	C	417	216	203	16	52	9	6	13	3		10	2	9	2		34	1		[1] 14
Bone	C	6	11	15	4												1			
Constantine	C			22	7							2					7			
Philippeville	C	1		1													2			
Oran Department	C	10	26	16	6		1		4											[1] 13
Southern Territories	C	2	9	4				1												
Australia: Sydney	C	1																		
Basutoland	C				9							6								
Bolivia. (See table below.)																				
Bulgaria	C												12							
Chile	C	253	272	273					49	47	32	48	57							
Concepcion Province	C	3	1	32	7	3	3	3	3	2	2									
Iquique	C	1	2															1		
Linares Province	C			9	3	2	1		3	1		1	2							
Malleco Province	C			5	2	1	3	2	4	1	1									
Nuble Province	C			7		2	1					14	1							
Santiago Province	C	113	111	137	40	41	25	45	35	36	22	21	50							
Valparaiso	C	71	105	50	14	8	15	10	6	2	4	2	5	4	5		1		1	2
China (see also table below):																				
Canton	C															1	2			
Dairen	C													1						
Hankow	C		1	1		1														
Nanking	C	4																		
Shanghai	C	4	4	5					2											
Swatow	C			3																
Tientsin	C	2	6	1				1		1	2					1				
Tsingtao	C	12		1																
Chosen. (See table below.)																				
Czechoslovakia. (See table below.)																				

[1] For 2 weeks.

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

TYPHUS FEVER—Continued

[C indicates cases, D, deaths; P, present]

Place		Apr. 25–May 29, 1937	May 30–June 26, 1937	June 27–July 31, 1937	Week ended— August 1937				September 1937				October 1937					November 1937		
					7	14	21	28	4	11	18	25	2	9	16	23	30	6	13	20
Egypt:																				
Alexandria	C	20	5	6	4	5	3	1	1	1	1	1		2	2			3	1	8
Aswan Province	C	6																		
Asyut Province	C		5	6	2											1				
Beheira Province	C	74	14	23	1															
Beni-Suef Province	C	1																1		
Cairo	C	17	1								1									
Dakahliya Province	C	74	15	31	3															
Damietta Province	C		2																	
Faiyum Province	C			1																
Gharbiya Province	C	135	55	41																
Girga Province	C	1	2	2																
Giza Province	C			2																
Minufiya Province	C	25	4	4																
Minya Province	C	2			1															
Port Said	C		1	2																
Qena Province	C	33	3																	
Sharkiya Province	C	11	3	1																
Suez	C		1	2					1	1										
Provinces	C	709	307	130	14	6	6	11	9			1	1	1	1			2	4	
Eritrea: Asmara	C	4	2	1															2	
Finland. (See table below.)																				
Germany: Frankfort-on-Main	C												1							
Great Britain—England and Wales—Gloucester County	C																			1
Greece. (See table below.)																				
Guatemala. (See table below.)																				
Hawaii Territory: Honolulu	C			4				1			2		2		2					1
Hungary	C	1		1																
Iran	C	14	25								1									
Teheran	C	1	1																	
Iraq:																				
Baghdad	C		1	2																
Diwaniyeh Province	C	6																		
Kirkuk Province	C	3	12	2																
Latvia. (See table below.)																				
Libya. (See table below.)																				
Lithuania. (See table below.)																				

Mexico (see also table below):																				
Mexico, D. F.	C	18		2	5	6	5	11	4	11	6	1	3	5	2	3	4	4	3	7
San Luis Potosi	D		1																	
Torreon	C																		1	
Morocco (see also table below)	C	352	174	85	7	3	9	2	6	7	3		1	17	11	7	2	1		6
Casablanca	C		200	5	3	2								4						
Nigeria	C												2							
Palestine:																				
Haifa	C	6	1	3	1		2	1	4	3	4		3		7		6	3		2
Jaffa	C	6	3	3	1	4	1	3	4	5			1		6	5	1	2	5	4
Panama Canal Zone. (See table below.)																				
Poland	C	805	287	89	13	19	6	5	5	6	8	7	9	9	9	19	7	12	10	23
	D	43	20	1	8	1										1		2	1	
Portugal. (See table below.)																				
Rumania. (See table below.)																				
Sierra Leone: Freetown	C	2																		
Straits Settlements: Singapore	C		1								1									
Switzerland				1										1						
Trans-Jordan	C	5		1															1	
Tunisia:																				
Tunis	C	20	19	4	2	6	1	1	5	1	1				2	1				3
Provinces	C	666	545	337	57	80	59	20	12	14		50	1	38	24	40	29	23	29	63
Turkey. (See table below.)																				
Union of South Africa. (See table below.)																				
Yugoslavia: Belgrade	C																	1		

Place		May 1937	June 1937	July 1937	August 1937	September 1937	October 1937
Bolivia	C	39	35				
China: Manchuria—Harbin	C	29	35	14	8	2	
Chosen	C	99	85				
Czechoslovakia	C	3					
Finland	C		1				
Greece	C	1	11	5	3	6	
Guatemala	C	12	8	16	10	6	2
Latvia	C					1	
Libya	C	13	34	10			
Lithuania	C	6	2	7		2	6
Mexico (see also table above):							
Aguascalientes State	C					1	
Aguascalientes	C	2					
Campeche State	C					2	
Durango State	C					1	
Guanajuato State	C	4		3		19	
Hidalgo State	C	1	2		3	4	
Jalisco State	C			1		2	
Mexico State	C	2		14	38	29	
Mexico D. F.	C	14	14	16	27	29	
Mexico City	D			5	3	4	

Place		May 1937	June 1937	July 1937	August 1937	September 1937	October 1937
Mexico—Continued.							
Michoacan State	C					5	
Puebla State	C					55	
Queretaro State	C	2	2		2	3	
San Luis Potosi State	C					6	
San Luis Potosi	C	2					
Tamaulipas State	C					2	
Tlaxcala State	C					3	
Vera Cruz State	C					9	
Zacatecas State	C					2	
Morocco (see also table above)	C	283	182	88	25	16	39
Panama Canal Zone	C	2			1	1	
Portugal	C				2	1	
Rumania	C	557	177	61	26	31	
Turkey	C	155	72	30	23	27	
Istanbul	C		3	2	2	4	
Union of South Africa:							
Cape Province	C	35	12	50	81		
Natal	C	7	13		2		
Orange Free State	C	27	35	11	2		
Transvaal	C	1	3	13			

CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER—Continued

YELLOW FEVER

[C indicates cases; D, deaths; P, present]

Place		Apr. 25–May 29, 1937	May 30–June 26, 1937	June 27–July 31, 1937	Week ended— August 1937: 7	14	21	28	September 1937: 4	11	18	25	October 1937: 2	9	16	23	30	November 1937: 6	13	20	27	Dec. 4, 1937
Brazil:																						
Amazonas State	D						1															
Matto Grosso State [1]	C	2																				
	D	4		1																		
Minas Geraes State [1]	D	1																				
Para State [1]	D			6			1				1											
Piauhy State	D		1																			
Colombia:																						
Boyaca Department	C	1	1	2			1															
	D	3		4			1	1							1							
Caldas Department	D										1											
Cundinamarca Department	D		2	1	1	1				1	1											
Intendencia of Meta—Villavicencio	D											1										
Santander Department	C								2													
	D	2		1	2			2			4	2	1				2					
Dahomey: Bohicon	C		1																			
French Equatorial Africa:																						
Bangui	D										1											
Fort Archambault	C										[2] 2											
Libreville	C			1																		
	D			1																		
Gold Coast	C	4	11	23	6	2		1		3			1	1		1	1	[2] 7			[2] 1	
	D	1	11	19	4					2			1					2			[2] 1	
Accra	C		2	2				1		[2] 1												
Huge	C	1																				
Ivory Coast:																						
Agboville	C					1																
Gaoua	C									2												[2] 1
	D									1	[2] 1											
Touba	D											[2] 1		[2] 2								

Nigeria:																						
Aba	C						1															
Abeokuta	C									1												
Forcados	C			1																		
Ibadan	C			1												[2] 1						
Jos	C													2								
Maiduguri	C																[2] 1					
Makurdi	C														1							
Ogbomosho	C			5																		
	D			2																		
Ovim	C					3																
	D			1																		
Sapele	C							1														
Shendam	C											1										
Wana	C																				2	
	D																				1	
Paraguay [4]	C			P																		
Asuncion	C																			1		
Senegal:																						
Bambey	C		[2] 1																			
Baol [5].																						
Dakar	C	[2] 1												[2] 1				[6] 2				
Diakhao	C	1													1							
Diourbel	C								1													[2] 1
	D						1															
Gade	C																	[2] 1				
Gossas	C							1				1		3								
Kaolakh	C																[2] 1	[2] 1				
Keur Moussa	C																				1	
Malem Hodar	C	1																				
Rufisque	C												1		1				2			
Sebikotane	C																	3				
	D																	1				
Tamba-Counda	C						[2] 1															
Thies	C														2		2				1	
Thies Circle—Khombole	C																	1				
Tilmaka	C	1																				
Sudan (French):																						
Mahina	C	[2] 1																				
Toukoto	C																		[2] 1			

[1] See also reports of yellow fever in Brazil on pp. 463, 536, 657, 683, 762, 818, 912, 1134, 1248, 1327, 1471, and 1637 of the PUBLIC HEALTH REPORTS.
[2] Suspected.
[3] Includes 1 suspected case.
[4] A dispatch dated June 4, 1937, from the United States legation in Asuncion, Paraguay, states that yellow fever has been officially reported in the northwestern part of Paraguay.
[5] During the week ended Dec. 18, 1937, 1 suspected case of yellow fever was reported in Baol, Senegal
[6] Imported.

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